

Contractors and Engineers

magazine of modern construction

NOVEMBER 1959

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Illinois modernizes U.S.-36 with Asphalt



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Editorial

Hold the cost line

A recent fact-finding report of the U. S. Department of Labor disclosed that output per man-hour in the steel industry has lagged far behind that of U. S. workers as a whole. Management has attributed this condition to restrictions in outmoded labor contracts that hamper and obstruct the efficiency and natural skills of its workers. Obviously, when efficiency is retarded, costs go up. And when costs rise, there is usually a drop in the demand for the product, for the consumer either resists the pressure to buy or seeks a cheaper substitute.

What is happening in steel can also happen in the construction industry, which is one of steel's best customers. While during the past year the cost of consumer goods has gone up about 1 per cent, building costs of both labor and materials have risen 4 per cent. Unless this change in price direction is reversed or at least stabilized, the demand for much needed construction in the year ahead may be lowered. This situation, of course, would be felt equally by both labor and the employing contractors.

Fortunately, both groups in this \$60-billion-a-year construction industry seem to be aware of the serious consequences of a runaway inflation in building costs. Earlier this year, national unions and national employers' associations established the Construction Industry Joint Conference. One of



The objectives of the conference is to improve the performance and productivity of both contractors and their employees. Management, through poor supervision, may be as guilty of anti-productivity practices as labor. Labor can help reduce the cost of construction by giving a full day's work for a full day's pay.

This old-fashioned but sound precept is the keynote of the 10-point program adopted last year by the Executive Council of the Building and Construction Trades Department, American Federation of Labor-Congress of Industrial Organizations. The program, popularly known as the "Ten Commandments," carries a mandate to eliminate bad labor practices on the job. Such practices may be orders from a superintendent that violate safety recommendations or some old featherbedding custom that requires a man to stand around for eight hours and watch a compressor at work.

CONTRACTORS AND ENGINEERS

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CONTRACTORS AND ENGIN

Narrowing the gap

The civil engineer's growing economic importance is beginning to show in the size of his pay check.

According to income figures compiled by the National Society of Professional Engineers, the median* earnings of civil engineers rose 10 per cent between 1956 and 1958 to \$9,620.

This was twice the gain reported by mechanical, mining, and metallurgical engineers and five times the rise for chemical engineers. Only the electrical engineers with a 9 per cent advance equalled the civil engineers' pay increase.

Earlier NSPE surveys in 1952, 1954, and 1956 had confirmed

the existence of a sizable gap between the earnings of civil engineers and those in other specialties. The narrowing of the gap between 1956 and 1958 was largely the result of what had happened to government engineering salaries during this period. The median salaries of federal engineers jumped 20 per cent between 1956 and 1958. State engineers averaged a 15 per cent gain, while county and municipal engineers' pay rose 13 per cent.

The need to attract and hold engineers to oversee the growing construction programs for roads, schools, housing, public transportation and water and sewage systems compelled governments on all levels

to bring engineering salaries more in line with prevailing industry rates.

But so, government salaries continued in 1958 to depress the over-all level of civil-engineering earnings.

The lowest 1958 incomes for any field were reported by state engineers,

whose median pay was \$8,530. Ten per cent of state salaries were under \$6,000.

The median pay of county and municipal engineers, who were second from the bottom of the pay scale, was \$7,410.

On the other hand, civil engineers working for construction contractors were among the best paid in the engineering profession in 1958. As the accompanying table shows, contractors offered top pay in the midwestern states west of the Mississippi, and in the Mountain and Pacific states. In the Southwest and in the midwestern states east of the Mississippi, engineers working for contractors received earnings second only to engineers in education, whose incomes can include consulting and research work.

In the northeastern and southern states, contractors' employees' incomes were exceeded only by those in the all-important oil industry.

The median 1958 income for all engineers in construction firms, including the self-employed, was the highest reported for any field of employment.

\$11,730 it was \$1,230 more than the \$10,500 averaged by engineers in industry, who were the second best paid.

Mack-motor truck drivers, who make the drivers' pay supports for their families, were paid \$10,000.

The "median" income can be thought of as the earnings of the man halfway up the ladder of his profession. If all civil engineers were lined up according to the size of their income, the median income would be the one belonging to the man exactly in the middle.

PROFESSIONAL ENGINEERS' EARNINGS BY FIELD OF EMPLOYMENT AND GEOGRAPHIC REGION

MEDIAN* INCOME:	New Eng., N. Y., N. J., Pa., Del., Md.	Va., N. C., S. C., Ga., Fla., Tenn., Miss., Ala.	Mich., Ohio, Ind., Wisc., Ill., Ky.	Minn., Ia., Mo., N. D., S. D., Neb., Ks., Mont., Wyo.	Ark., La., Okla., Tex., Colo., N. M.	Idaho, Utah, Ariz., Nev., Wash., Oreg., Calif.
Construction Contractor						
Employees	10,670	9,920	9,920	10,330	9,810	11,220
Self-employed	18,000	14,180	17,390	15,600	15,600	15,330
Industry						
Employees	\$11,020	\$10,130	\$ 9,860	\$ 9,990	\$ 9,690	\$10,320
Self-employed	16,630	17,140	17,400	17,330	16,330	15,430
Public Utilities						
Employees	10,600	9,000	9,630	9,310	8,600	9,500
Federal Government						
Employees	10,210	9,940	9,770	9,330	9,710	9,700
State Government						
Employees	8,980	8,370	9,310	7,860	7,910	8,540
County and Municipal Government						
Employees	8,480	8,450	8,100	7,970	8,060	9,290
Education						
Employees	9,930	9,790	10,710	9,300	10,080	10,250
Consulting Firms						
Employees	9,750	8,930	8,840	8,540	8,420	9,500
Self-employed	15,230	14,210	14,110	14,000	14,290	14,350

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Surveying Washington..

by E. E. Halmos, Jr.



Glen Canyon Dam shutdown to test zone labor agreements

The federal government's refusal to shoulder most of the costs of new wage demands at huge Glen Canyon Dam in Arizona has far more importance than appears on the surface. It could well be a major crack in attempts by contractors and unions in several western states at "zone" or area labor agreements.

Here's the background. Merritt-Chapman & Scott, which holds the prime contract for the big multipurpose dam, was shut down July 6 when five primary construction unions demanded wage raises that average 50 cents an hour higher than those specified in an Arizona state-wide agreement. Under terms of its contract, the government (the U. S. Bureau of Reclamation) is liable for 85 per cent of the cost of any wage increase except—and this is important—for subsistence payments. Added costs imposed by a new wage agreement at the rates demanded would come out to about \$5 million.

BuRec politely, but firmly, refused to be a party to any raises proposed. It does not believe that the newly established town of Page, Ariz., (at the dam site) is a "hardship" area, and it feels that the proposed raises are in reality based on the unions' contention that their men should get expense allowances for subsistence. The refusal of BuRec brought the negotiations to at least a momentary standstill.

An Arizona state-wide agreement, between construction trades and the state AGC chapter, sets up wage rates in a number of city zones and provides "expense allowances" for areas outside those zones. Page—a new town—is outside the previous zones.

What the action sets up is this question: If unions and contractors insist on such agreements, aren't they retarding development of many areas (particularly in the west) outside present municipal centers, where work may be planned in the future? Many agencies—private as well as public—may follow BuRec's example,

and figure that "expense allowances" make wages just too high for economic construction.

Odds favor 1960 passage of bill for pollution works

In your search for future business, it will pay to keep a close watch on what happens to HR 3610, the Blatnik Bill, which would jump grant-in-aid for sewage and pollution abatement works to \$100 million a year, for at least ten years to come.

Note that the figure for federal money is big—but you can figure four times that amount, in actuality, to arrive at the value of the construction work it would generate.

Look at these facts. Under the existing program (providing \$50 million a year over the past three years), the federal government has granted a total of \$131 million (to June 30). That has been put out to finance the federal share (30% of project cost, or \$250,000, whichever is less) of some 1,583 projects. But actual costs of those projects, both those completed and those still under way, now total more than \$685 million. And most of that has gone for construction.

Thus, if the amount of federal grants is doubled, it means something like \$400 million a year for this construction market. And much of this work is in small enough pieces so that almost any contractor can get in on the job.

In fact, the Department of Health, Education and Welfare figures there's a backlog of some \$1.75 billion worth

of work in this field, just to bring U. S. up even with the current need for pollution control and to provide for modest population increases. Blatnik's bill (he authored the environmental legislation three years ago) through the House early this year with almost no objection. It passed the Senate, too, in the last days of session, but was cut back there to \$100 million a year. There was no time for a conference on the two versions, so the measure will be one of the first items on the agenda when Congress reconvenes, January 6. There's little doubt that the bill will get through.

One snag, however, may be the administration's attitude. Presid

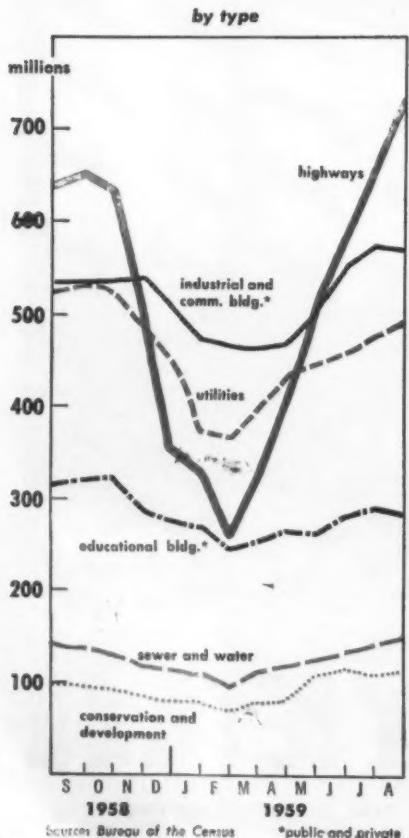


Eisenhower is openly opposed to it. He wants to eliminate it on the ground that the pollution problem is a proper matter for state, not federal, action. Administration spokesmen said as much during hearings this year and make no secret that, even if Congress does enact legislation at the next session, it's going to be hard to pry money out of H

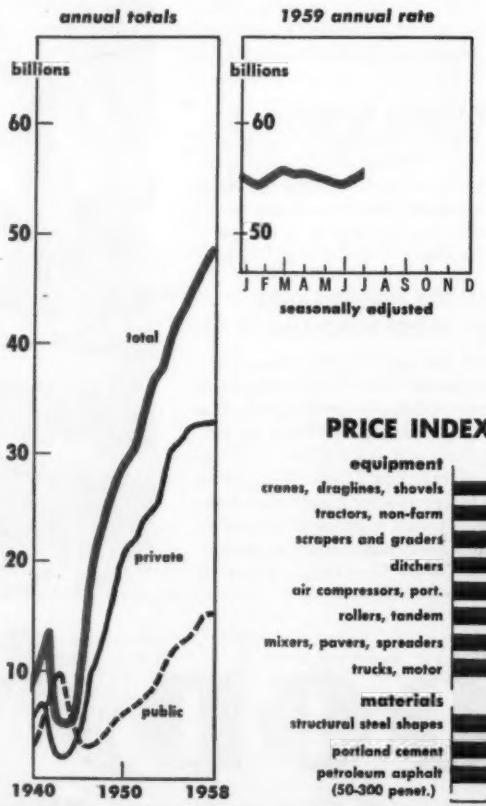
However, in an election year, C

Industry Trends

DOLLAR VALUE OF NEW CONSTRUCTION Recent Monthly Trends

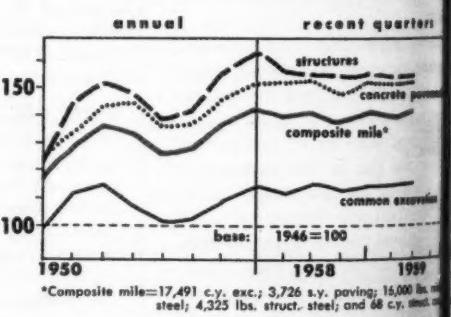


Sources: Bureau of the Census



*public and private

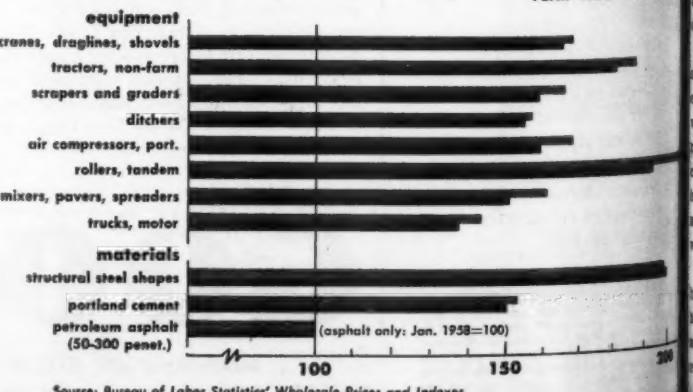
AVERAGE BID PRICES Federal Aid Highway Construction



*Composite mile = 17,491 c.y. exc.; 3,726 s.y. paving; 15,000 lbs. steel; 4,325 lbs. struct. steel; and 68 c.y. sand and gravel.

Source: Bureau of Public Roads

PRICE INDEX 1947-1949 = 100



Source: Bureau of Labor Statistics' Wholesale Prices and Indexes

to bring up the issue will feel strongly about a proposal that makes work and business better in home areas, as well as improves increases in international and economic uses of the economy.

Some organization dues not tax deductible

Watch the organizations to which you pay dues. Under a new ruling of Internal Revenue Service, "dues and other payments to an organization . . . are deductible in full, unless a substantial part of the organization's activities consists of one or more of these:

"Expenditures for lobbying, for promotion or defeat of legislation, for political campaign purposes (including the support of or opposition to a candidate for public office), or for carrying on propaganda (including advertising) related to any of the foregoing purposes."

Capital-gains provision valid for builder

Be careful about claiming any construction income under the more advantageous "capital-gains" provisions of the federal tax laws.

A Philadelphia builder bought a piece of land, built a warehouse on it for an insurance company, collected rent on it for about a year, then sold the building to the insurance company. He claimed "capital gains" on the transaction.

But the Internal Revenue Service said that the builder was in fact a "package builder," had worked with the eventual buyer from the inception of his project, and had collected the rent only in an interim period covered by a contract with the insurance company.

The tax court upheld this position (2 TC #109), ruling that the builder would have to pay taxes on the transaction as "ordinary income from business or profession," not as capital gains.

Highway Program investigations are having a shaky start

Don't get too excited over those reports out of Washington concerning all the pending investigations of the highway program. There are three investigations set: by the House Ways and Means Committee; the House Public Works Committee; and also by the Executive Offices of the President. One of these—the Ways and Means—won't go anywhere at all. The other two won't really start until next year, and there's a lot of doubt as to the direction they'll take.

On Ways and Means, this is the situation. The committee is a little embarrassed by the authority to investigate, because it overlaps the jurisdiction of Public Works. So the committee has scheduled weeks of hearings on small business and tax matters and will happily leave the investigation to Public Works.

The Public Works subcommittee is headed by Rep. John A. Blatnik (D., Minn.), who says he's not looking for scandal, but just wants to see that everything is going right. But note that

the staff he's built up so far is composed entirely of ex-FBI investigators. Anyway, no hearings will be held, and little more than gathering of background will be done until well after Congress reconvenes.

The President's group, headed by Maj. Gen. John A. Bragdon, has already started to gather some information and has employed a consultant. But general consensus is that it'll be a defensive outfit, to counter political charges that may come out of Public Works' studies.

And don't expect much to be done about the costs of federal-aid work in the cities. True, those costs are a large part of the hike in the cost of the program. But in a political year, they'll be soft-pedaled, if this is at all possible.

Big labor cases set for high court review

Also before the high court are two labor matters of importance to the construction industry.

One pits the U. S. Department of Labor against the H. B. Zachry Co., with labor seeking a decision supporting its argument that construction workers on a dam near Corpus Christi, Texas, come under provisions of the federal wage-hour laws on the ground that they are engaged in producing "goods for commerce." Lower courts have sustained the contractor's contention that construction work of this kind is not a matter of interstate commerce, or even of "commerce" in the accepted meaning of the word.

The second case is an appeal by a labor union from a \$75,000 judgment

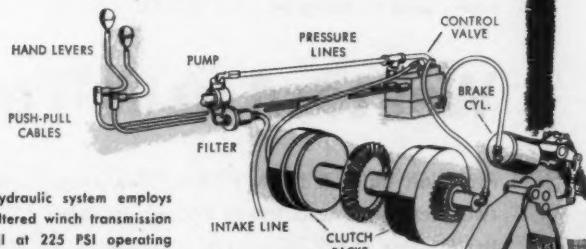


against it for damages allegedly suffered by a contractor due to secondary boycott activities. Attorneys for Carpenters Union Local 131 argue that their union's strike against Cisco Construction Co. of Seattle wasn't unlawful, even though lower courts held that off-site secondary boycott activities injured the company.

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Labor Review

Pittsburgh boilermakers end 14-week-long strike under interim agreement

Some 600 boilermakers ended their 14-week-long strike against 12 companies in western Pennsylvania, West Virginia, and Ohio on the basis of an interim agreement that calls for a return to work, a 90-day cooling-off period, and further negotiations thereafter.

Strikers returned to work with a 15-cent hourly wage increase, plus last year's contract. The agreement calls for a resumption of negotiations after 90 days but provides that there shall be no strikes or lockouts until settlement on a new local contract is reached.

The interim agreement also provides that all contractors will work under the national agreement signed August 20 between the contractors and the International Union, except where the local contract provides for greater benefits locally.

Most seriously at issue are show-up time and shift work, for the retention of which the union went on strike. Presently, according to a union spokesman, boilermakers are paid for a minimum of four hours if an employer fails to notify them that there is no work. On shift work, the present contract calls for eight hours of pay for seven hours of work on the second and third shifts.

The employers had sought to reduce the minimum show-up time pay, and their latest offer on shift work was to increase from seven to seven and a half hours the work required for eight hours' pay on the second shift. Their original demand had been for seven and a half hours' work on the third shift and the full eight hours on the second.

Joint Board chairman bothered by increase in jurisdictional strikes

Jurisdictional strikes in the construction industry are an "unjustifiable extravagance," since there is an established procedure for settling disputes peacefully, and since this procedure generally must be invoked anyway, Richard Mitchell, chairman of the National Joint Board for the Settlement of Jurisdictional Disputes, reminded delegates to the AFL-CIO Building and Construction Trades Department's San Francisco convention.

Mitchell reviewed the history and operations of the Joint Board and reported on work stoppages during comparable periods of 1957, 1958, and 1959. In the first six months of 1957, Mitchell said, Joint Board records show 379 work stoppages because of jurisdictional disputes, with 65 picket-line actions.

The number of work stoppages dropped to 211 for the first half of 1958, with 46 picket-line actions, but increased to 231 with 62 picket-line actions during the first six months of this year, Mitchell said.

By way of illustration, Mitchell

quoted figures given him by a large general contractor:

"In the year 1958 he had twelve work stoppages. Among these twelve, four included picket-line actions. The total man-hours lost by the trades in these work stoppages were 69,721 man-hours. The estimated loss in wages for those workmen is \$225,000.

"The estimated loss to the contractor due to continuing job supervision and job service was \$60,000, making a total loss to both management and trades, however, over the 12 disputes of \$285,000."

These 12 disputes, Mitchell said,

later were settled either by the Joint Board or by the unions involved—as they would have been had there been no work stoppages in the first place.

Senate rackets committee charges "serious misuse" of Carpenters Union funds

Maurice L. Hutcheson, president of the Carpenters Union, is charged in findings, prepared for the Senate labor rackets committee's approval, with "serious misuse" of the union's funds.

Hutcheson is accused of turning over \$519,000 in union funds to a "shrewd confidence man," Maxwell C. Raddock, with "noticeably little return," and of overpaying Raddock another \$200,000 for a plagiarized

biography of Hutcheson's father, William L. Hutcheson, former president of the union.

The findings also accuse Hutcheson of using Raddock as a "fixer" in an attempt to head off the indictment of Hutcheson, vice president William O. Blaier, and treasurer Frank Chapman. The three escaped indictment in Lake County, Ind., where the alleged fixing effort took place, but subsequently were indicted in Marion County for alleged fraud in connection with the sale of land for a state highway.

Because of the indictment in Indiana, Hutcheson declined to answer the committee's questions about his use of union funds. He thus is in vi-



Western moved and replaced over 4 million yards of earth in building special \$13,000,000 Jet runways for S.A.C. at Wright-Patterson A.F.B.

Western is pushing for November 1960 completion of runway, ramp and taxi areas. They're using Texaco Lubricants.

Western uses Texaco Lube Plan

Problem: build a runway two miles long, two feet thick, and tough enough to take the landing shock of planes as heavy as a locomotive—a priority project that must be finished early in 1960. Western Contracting Corporation, Sioux City, Iowa, is moving ahead on this one right now, at the new \$22-million Strategic Air Command Wright-Patterson Air Force Base near Dayton, Ohio. And to help make sure they finish

on schedule, Western relies on a Texaco Lubricants Simplified Lubrication Plan.

Here's how it works. The Texaco Lubricants Simplified Lubrication Plan cuts total lube inventory down to six products. That way, each of Western's lubrication stations is a complete service station on wheels, able to lubricate every piece of equipment wherever it is.

The low inventory Texaco Lubricants Simplified Lubrication Plan reduces the chances for misapplication, too. It's a Texaco Lubricants Simplified Lubrication Plan.

of the AFL-CIO Ethical Practices Committee, but he has not been tried by the Ethical Practices Committee because the indictment is still pending.

AFL-CIO's George Meany predicts labor comeback via "political action"

The 1959 Labor Day message of AFL-CIO president George Meany was directed largely at management and politicians.

The general thesis was that labor has taken a bloody nose from the concerted attacks of business and industry, which have (1) come out for a wage freeze, as symbolized in the steel strike, (2) undertaken an all-out

campaign in Congress to obtain anti-labor legislation, and (3) financed a "blistering bombardment" in the states to undermine unions through enactment of right-to-work laws.

Labor, Meany said, is going to meet the challenge in two ways.

First, AFL-CIO is going to mobilize "the maximum organizational, financial, and moral support to insure victory for the steelworkers. Once that victory is won, the whole wall of resistance erected by big business against further wage increases will crumble," he predicts.

Second, "We have determined that we will have to organize for political education and political action in the same thorough and painstaking way

that we organized in the past for economic purposes.

"We want the American people to understand that labor is entering upon the political battleground with reluctance. If we had any other recourse, we would be happy to stay out of politics. But our enemies have chosen to weaken the trade-union movement through restrictive legislation so that it will be rendered ineffective at the bargaining table. To remain true to our trust, to fulfill the responsibilities that the workers of this country have delegated to their unions, labor must fight back in the political arena. We intend to use every legal weapon we have, including the right of every citizen to en-

gage in politics, to regain the ground we have lost."

An intensive public-relations program appears to be in the works, for Meany says education will play a key part in this effort.

Southern Illinois laborers end 6-week walkout with agreement on hiring

With formal, contractual assurances on hiring, laborers in southern Illinois returned to work after a 6-week work stoppage.

Separate agreements were signed by the Southern Illinois Contractors Association, employing highway laborers in twelve southern Illinois counties, and the Southern Illinois Builders Association, negotiating with building laborers in East St. Louis and Granite City.

Both contracts pick up the union's recommendations on hiring, with one modifying sentence. The amendment is tacked onto the union's promise to maintain its lists and refer laborers without discrimination because of union membership, and provides that "selection of applicants for referral shall not be based on or in any way affected by union membership, by-laws, rules, regulations, constitutional provisions, or any other aspects or obligations of union membership, policies, or requirements."

Union shop provisions are spelled out, followed by details of the actual hiring hall and the contractors' agreement not to "solicit applications directly or . . . in any manner circumvent the union in the recruitment of applicants for employment."

Under the new pact, contractors can turn down prospective employees or discharge for cause. The number of men to be hired remains in the hands of the contractors, who are also assured that "there shall be no restrictions as to the use of machinery, tools, or appliances."

Highway laborers get an additional 30 cents an hour in wages over the next two years. The initial 15-cents-an-hour increase ups the rate to \$3.15 an hour in nonindustrial areas and to \$3.30 in industrial areas. Another 15 cents an hour will be added to wages next year. An association official notes that the rate for laborers in Alton and Wood River is 5 cents an hour less, with the nickel going into a health-welfare fund.

Wages for building laborers in East St. Louis and Granite City remain unchanged at \$3.15 an hour.

Agreement is reached by boilermakers in south central states

Boilermakers working in Texas, Louisiana, Oklahoma, Arkansas, and New Mexico got a 15-cent raise in hourly pay as their union and the South Central Employers reached agreement on a new field construction contract for the 5-state area.

New wage rates, effective September 10, are as follows: Foreman, \$4.25; Assistant Foreman, \$4; Boilermaker-Blacksmith, \$3.75; and Helper, \$3.50.

The contract runs for one year.



Western's Texaco Plan enables mobile rig to handle all major lubrication in the field—eliminates wasteful deadheading.

Play pave the way for S.A.C.

on a Ton hours in storage and handling. It cuts paper work in ordering. And every lubricant in Western's Texaco Plan was chosen to meet the specific requirements of the job.

Cut costs on your next job. Get all the facts on the Texaco Simplified Lubrication Plan from your Texaco Lubrication Engineer, or write:

Texaco Inc., 135 East 42nd Street, New York
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Throughout the United States
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LUBRICATION IS A MAJOR FACTOR IN COST CONTROL
(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

For more facts, use Request Card at page 18 and circle No. 254

NOVEMBER, 1959

9

Names in the News



Frank A. Marston, president of the American Society of Civil Engineers.

ASCE officers elected

Frank A. Marston has been elected 1959-60 president of the American Society of Civil Engineers. Marston, who succeeds Francis S. Friel, is a partner in the Boston engineering firm of Metcalf & Eddy.

Other newly elected officers are Charles B. Molineaux, vice president for Zone 1, and Lawrence A. Elsener, vice president for Zone IV. Six district directors have also been elected: Elmer K. Timby, District 1; Samuel S. Baxter, District 4; Thomas M. Niles, District 8; Trent R. Dames, District 11; Woodrow W. Baker, District 14; and Bernhard Dornblatt, District 15.

Iowa Highway news

The Iowa State Highway Commission has appointed Van Snyder district engineer at Cedar Rapids, succeeding R. M. Tutton; Joseph L. Holdefer replaces Earl Capel, who retired, as district engineer in Sioux City; and Earl Beissell is the new assistant district engineer for secondary roads at Fairfield.

Roy Kuhn, former assistant resident engineer at Sheldon, takes over the post of division maintenance engineer at Rock Rapids. This post was vacated when Eugene Cook retired. Odell C. Solem fills the post of resident engineer at Britt. He replaces Gerhard Andersen, who has been assigned to work with the Automotive Safety Foundation which is conducting a study of Iowa's streets and roads.

Folmar & Flinn appoints

Alfred K. Allen has been named executive vice president of Folmar & Flinn Industries, Inc., construction and engineering firm of Montgomery, Ala. He will supervise the company's construction work. Immediately prior to joining the company, Allen had been vice president in charge of construction of Utah Construction Co. of San Francisco. A veteran administrator in the construction and engineering fields, Allen is also a member of The Moles, a group of experts in underground construction.

Fruin-Colnon assigns

Warren C. Hargreaves has joined the Fruin-Colnon Contracting Co., St. Louis, as safety director. He will coordinate and centralize the company's safety supervision. Formerly, each division and subsidiary was individually responsible for its safety program.

Gen. Lipscomb now heads North Atlantic Division

Brig. Gen. Thomas H. Lipscomb has assumed command of the U. S. Army Engineer Division, North Atlantic. He succeeds Brig. Gen. Clarence Renshaw, now assistant chief of Army Engineers for Military Construction, Washington, D. C.

As division engineer, Gen. Lipscomb will direct the military and civil-works projects of the New York,

Philadelphia, Baltimore, Washington (D. C.), Norfolk, and Eastern Ocean districts. This division has a project placement of \$1 million per day, including missile bases, jet-aircraft bases, river and harbor construction, water control and conservation works, and some of the largest flood-control projects in the East.

Gray Corp. names manager

Ira L. Carpenter has been appointed manager of industrial construction for the Edward Gray Corp., Chicago. He will supervise coke-oven business, coal-handling problems,

and industrial construction for the Cabot, Cabot & Forbes international contracting, building forms and demolition company.

Perlite Institute names new technical director

The Perlite Institute has named Richard E. Barnes its technical director. He will assist member companies with their technical problems, supervise the institute's research activities, represent the institute to technical committees of allied associations in the building and construction field, and help to prepare technical literature and information

3 HIGH-PRODUCTION CAT



Cabot, Cabot & Forbes forms new subsidiary

Cabot, Cabot & Forbes Co., Boston, has formed a new subsidiary, Cabot, Cabot & Forbes Associates, Inc., for the practice of architecture and engineering. The personnel of the CC&F Engineering Division has been transferred to CC&F Associates, which will continue to provide the site-planning, architectural, and engineering research and consulting services offered in the CC&F pack-plan program.

President of the new subsidiary is George Burton, who is also president of Aberthaw Construction Co.

and vice president of the parent company. Charles H. Crombie is vice president, and John J. Hammond is treasurer.

Conley appoints officer

Rear Adm. Norman F. Garton (USN, ret.) has been appointed vice president for project development at Conley Engineering Co., Los Angeles. Previously, Rear Adm. Garton was the head of facility engineering for Hughes Aircraft Co., where he handled major construction programs involving facility expansion and conversion.

Kuljian officers view Soviet power facilities

Harry A. Kuljian, president, and Harvey F. McPhail, manager of the Hydroelectric Division, of The Kuljian Corp., Philadelphia, acted as nonpaid consultants to the 9-man team from the Senate Committee on Interior and Insular Affairs, which recently visited Russia to view hydroelectric dams and other power facilities.

Kuljian has designed and engineered more than 80 power plants throughout the world. McPhail, former assistant commissioner of the

U. S. Bureau of Reclamation for irrigation and power, has played a major role in the design and supervision of some of the world's largest power projects, including the Grand Coulee, Hoover, and Shasta dams.



Theodore E. Casselman, Jr., manager of the New York City office of Stone & Webster Engineering Corp.

Stone & Webster names

Theodore E. Casselman, Jr., has been named manager of the New York City office of Stone & Webster Engineering Corp. He was previously assistant engineering manager in the Boston office.

Dravo promotes manager; opens branch office

William L. Price has been appointed manager of engineering and materials for the Keystone Division of Dravo Corp., Pittsburgh. He has been manager of engineering for the division for the past eight years.

Dudley Coles has been assigned to the new Philadelphia office to supervise sales in connection with Dravo's heavy-construction fleet based at the Wilmington, Del., plant. Although his territory includes all of the East Coast, he will concentrate on the Philadelphia, Wilmington, Baltimore, and Washington area.

NCMPA elects Nern

William B. Nern has been elected president of the National Corrugated Metal Pipe Association. He is manager of the metal-culvert-pipe sales division of Wheeling Corrugating Co., subsidiary of Wheeling Steel Corp., Wheeling, W. Va.

WKE promotes engineer

Robert H. Raring has been promoted from project engineer to business-development engineer for the Western-Knapp Engineering Co. of San Francisco. He has been associated, in both operational and administrative capacities, with gold-mining operations in British Columbia and at Portovelo, Ecuador.

Highway department news

Edward Fitzgerald has been appointed highway maintenance superintendent in Susquehanna County by the Pennsylvania Department of Highways.

Daniel Construction news

A new office in Atlanta, Ga., has been opened by Daniel Construction Co., Greenville, S. C. The new branch is located at 1401 Peachtree St. N. E. James F. Daniel, III, project manager, will also be manager of the new office; Samuel Wilson will be manager of sales.

For more facts, circle No. 255

CATERPILLAR GRADERS...to fit any job!

WHY ARE—Caterpillar's three modern, heavy-duty Motor Graders are designed to outwork any machine of comparable size. Each is ruggedly built to deliver unequalled availability under most conditions. Pick the one that meets your job needs—then count on it to do a whale of a job for you.

No. 14, the industry's first and only Turbocharged Motor Grader, is the most versatile BIG grader ever developed. It operates at the highest practical working speeds with either a 12-foot or moldboard. Built to handle the biggest jobs, it will profitably serve you on many applications. For example:

Power Applications like heavy grading, heavy ditching, cutting and bank sloping.

Control Applications like light spreading, surface maintenance grading and light blading.

No. 12, known for more than 20 years as the "standard industry," has recently been improved to increase its super-similarity to similar-size graders. Here are some improvements unique to its greater capacity:

Clearance between the top edge of the blade and bottom of the circle has been increased to provide improved rolling over more material to move across the blade.

Blade Thickness has been increased and blade beams have been increased in length and thickness to handle heavier loads.

New Mechanical Controls for reduced kickback, easier control.

New Blade Controls feature a positive mechanical lock—with Caterpillar. When control is in neutral, the power is locked by a set of gear teeth to prevent creeping.

No. 112 has also been improved recently—including the controls mentioned above. Use the No. 112 on smaller jobs and you can touch it for efficient performance!

There are just some of many features that put Cat Motor Graders front with higher production at lower operating cost. For a complete picture, see your Caterpillar Dealer. Ask him to illustrate—just say when and where, he'll be there!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

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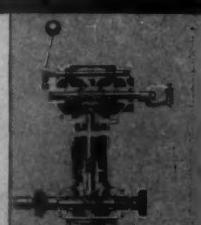
**MODERN
HEAVY-DUTY MACHINES
TO FIT ANY JOB!**

HIGH-PRODUCTION FEATURES OF CAT MOTOR GRADERS!

PRECO AUTOMATIC BLADE CONTROL Optional. Exclusive for Caterpillar Graders, improves performance on a wide range of applications. Operator selects desired slope on dial. Now transistorized for freedom from maintenance and adjustment, the unit automatically maintains blade slope within $\frac{1}{8}$ inch in 10 feet.



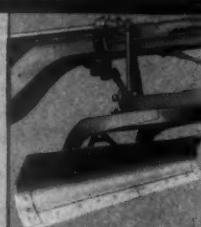
MECHANICAL BLADE CONTROLS Standard. Exclusive. New Caterpillar mechanical blade controls ease engagement, provide precise blade adjustment and reduce kickback. "Anti-creep" lock makes blade stay put under load. Another plus: Operator, while seated, has unobstructed view of job.



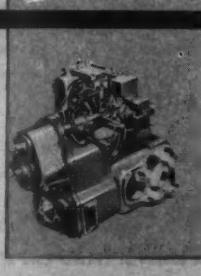
NEW DRY-TYPE AIR CLEANER Most efficient air cleaner ever developed. Removes 99.8% of all dirt from intake air during every service hour. Can be serviced in five minutes. Cuts maintenance time (by as much as 70%) and substantially reduces costs. Extends engine life.

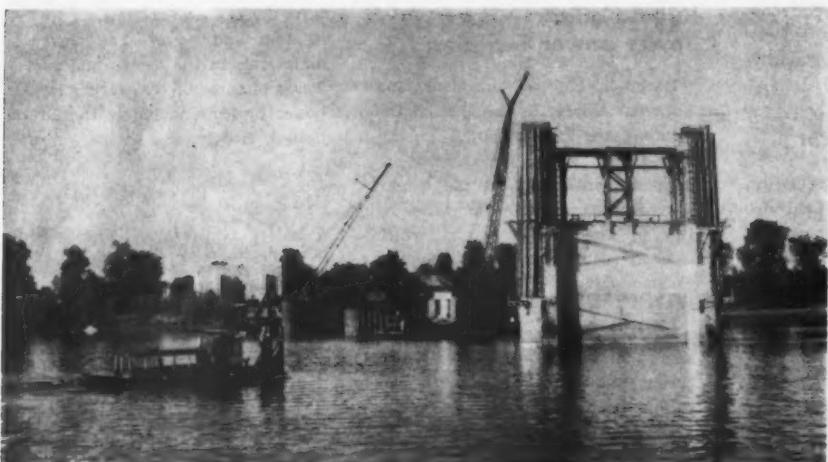


AMPLE THROAT CLEARANCE New design on the No. 14 and No. 12 permits increased clearance between moldboard and circle for maximum loads. Extra strength is built into frame, drawbar and circle to match engine power, absorb the punishment of rough work and assure accurate grading.



OIL CLUTCH Both the No. 14 and No. 12 are equipped with the most advanced clutch design in the industry—proven by millions of hours of use. Provides up to 2,000 hours' service without adjustment, the equivalent of about 12 months of "adjustment free" operation. Virtually eliminates down time for clutch repair.





Piers rising out of the Arkansas River for the new expressway bridge in Little Rock mean the worst problems—seating and sealing sheet-pile cofferdams in shale and rock—are over for the contractor. Forming on Pier 19 has now reached the bottom of the pier cap. An American 20-ton steam Revolver drives sheet piling for Pier 20; another revolving crane works on Pier 21. The boat is used to bring workmen to the piers.

**Contractor battles shale, rocks
to set cofferdams and overcome . . .**

Tough going on bridge-pier cofferdams

BEST BUY IN 2-WAY RADIO!

- COOLER OPERATION
- LOWER BATTERY DRAIN
- NEW CABLING SYSTEM
- 5 WATTS OF AUDIO
- "ROAD MAP" CIRCUITRY
- STANDBY CONTROL
- RCA SERVICE

ANOTHER WAY
RCA SERVES
BUSINESS
THROUGH
ELECTRONICS

New RCA Transistorized "Low Drain" Mobile Unit Greatest Value...in Performance...Service...Price

Looked at from any angle—performance, service, price—the new "LD" (Low battery Drain) 2-Way Radio is sensational news from the leader. Minimum tubes in the receiver, no vibrators in the power supply—they've been replaced by readily available stock transistors for long life and dependability! Transistors used only in circuits where long experience has proven they can give reliable performance. Your RCA representative will be glad to show you why the "LD"—dollar for dollar, feature for feature—is today's greatest 2-way radio value.

Heat drain reduces internal temperature of unit up to 40%, providing longer component life (case has wrap-

around heat sink). Standby monitoring feature cuts battery drain to a mere $2\frac{1}{4}$ amps. With vehicle engine off, radio can be left on to receive incoming messages for long periods without impairing battery life—automotive cabling used exclusively for greater flexibility, positive contact, corrosion resistance. Five watts of audio power for greatest message intelligibility. Equipment easily moved from car-to-car—trunk or true-dash mount. Security sealed circuits clearly numbered to provide "road map" for fast, simple servicing—RCA Service Company technicians available to keep your equipment operating at maximum efficiency.

Mail coupon for further facts.



RADIO CORPORATION of AMERICA

COMMUNICATIONS DIVISION • CAMDEN, N. J.



For more facts, use coupon or Request Card at page 18 and circle No. 256

RADIO CORPORATION OF AMERICA
Communications Division, Dept. A-277, Building 15-1, Camden, N.J.

- Please send me FREE literature on the new RCA Transistorized Mobile Radio
 Have RCA Communications Specialist contact me and explain why this is today's best value in 2-way radio

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CITY _____ ZONE _____ STATE _____

You never know what's in a river bed until you start driving a cofferdam. And then when you find out, you sometimes wish you had never started.

In driving the cofferdams for an expressway bridge crossing the Arkansas River at Little Rock, the contractor often wished he had not been the lucky low bidder. The going was rough all the way. Rock and shale formations beneath the sand of the river bed made it almost impossible to seat and seal the sheet-pile cofferdams.

Massman Construction Co., Kansas City, Mo., contractor for the main piers, has built a lot of bridges in the Midwest but has seldom seen a bridge as difficult to get out of the water. In an effort to seat and seal the big 50-foot-deep cofferdams, it tried everything in the book.

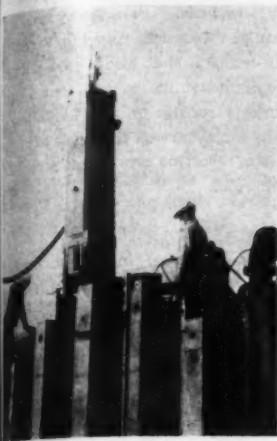
Troubles

When rocks caused the sheeting to split open, an outside wall of sheet pile, or "blister," was driven to shore off the break. Grout often had to be used to seal the joint between the irregular surface of the rock and the bottom of the sheet piles.

The boulders embedded in the shale often caused the sheeting to bend. This prevented the cofferdam frame from moving downwards. To get it down, superintendent Dunlap tried various methods. Extra weight, in the form of sheet piling, was placed on top of the frame. A steam hammer knocked on the top wale to get the frame down. If this didn't work, a couple of sticks of dynamite were exploded under water to shake the frame loose. Sometimes, a diver was sent down to locate the cause of the trouble.

Sweat and swear method

There was no set way of getting the cofferdams down, for no one could tell what the bottom of the piles was running into. It was a matter of trying one thing and, if that didn't work, trying something else. It's sweating and swearing and working



Crews position a McKiernan-Terry 143 steam hammer to drive sheeting for the cofferdam around Pier 21. Workers in the shale caused plenty of trouble on this phase of the operation.

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Massman's contract of \$931,096 called for the construction of the seven river piers. They were good and pier, requiring about 8,500 cubic yards of concrete. Founded on shale, typical footing measures 67x25x6 feet. Two round-nosed pier columns, built by a 3-foot-thick web, rise from the footings to heights as great as 106 feet. The web reaches to within about 8 feet of the cap.

The large block-shaped abutments were completed under a separate contract by E. E. Barber Construction Co., Fort Smith, Ark. Massman completed the substructure earlier this year, and American Bridge started immediately on the superstructure. The entire bridge is expected to be ready for traffic in 1961. The Arkansas State Highway Commission is supervising the construction.

It was a hard job and, if there was anything else, it would have been even harder.

(Continued on next page)

A man with a Lincoln 400-amp welding machine welds a stiffening plate to one of the struts of the bottom ring of the cofferdam frame. The lower two rings of the frame were assembled on pontoon barges and floated into position over the pier location. ▶



B.F.Goodrich



Why contractor calls B.F.Goodrich tires "the best tires for the job!"

KILLIAN-HOUSE CO. constructs roads and bridges within a 100-mile radius of San Antonio, Texas. 143 pieces of rubber-tired equipment are at work, including 30 flat bed trucks, 10 scrapers, 24 dump trucks, 30 pick-ups, 12 road rollers and 12 water trucks. The company uses B.F.Goodrich tires on this fleet because, says Partner Jack House, "They are the best tires for the job."

For example: Traction Express tires average 75,000 miles of service where previous makes gave considerably less; Tractor Grader tires are being retreaded as many as 4 times; on the new Rock Service Tubeless tires above, the company estimates retreads will save them 30% over other makes.

The new B.F.Goodrich Rock Service

tire has an enormous, double-chevron tread that defies rock cuts and bruises, grips the ground for full traction in forward or reverse. Under the tread is the B.F.Goodrich FLEX-RITE NYLON cord body that withstands double the impact of ordinary cord materials, resists heat blowouts and flex breaks. This is why the FLEX-RITE NYLON body outwears even the extra-thick Rock Service tread, can be retreaded over and over.

See your B.F.Goodrich Smileage dealer today and find out how you can save on tires for all types of off-the-road jobs. He's listed under Tires in the Yellow Pages of your phone book. B.F.Goodrich Tire Co., A Division of The B.F.Goodrich Co., Akron 18, Ohio.

Specify B.F.Goodrich Tubeless or tube-type tires when ordering new equipment



Smileage!

B.F.Goodrich truck tires

For more facts, use Request Card at page 18 and circle No. 257

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A 25-ton stiffleg derrick on the south bank works on a pier and also transfers heavy materials from rail cars to barges. Two American hoists power the derrick. At this point, the rig is pulling sheet piles of the cofferdam around the partially completed pier.

(Continued from preceding page)

was typical. The 55-foot sheet piles were driven in about 10 feet of water through 35 feet of sand to "toe in" to shale. The 29x75-foot cofferdam allowed a 3.5-foot width between the bottom of the sheeting and the edge of the 5-foot-deep footing.

The job of floating the first two rings of the cofferdam frame into position and starting the sheet piles through the sand went smoothly enough. Most of the sand was pumped out with a 10-inch air-lift pump. The remainder of the sand excavation was clammed out by an American 20-ton Steam Revolver.

The trouble came when the sheet piles hit shale. Boulders in the shale caused about a 20-foot break in the sheeting. This had to be sealed off with an extra wall of piles—a "blister."

Water undercut piles

After finally getting the cofferdam tight, they pumped it out using two 10-inch and three 6-inch Marlow pumps. While the footing was being cut out with air spades and jackhammers, the water started to push its way underneath the wall of sheet piles. The shale, which was naturally pretty rotten, was crumbling under exposure to air, and the pressure of the water was causing it to give way. Soon the water was pouring in faster than the pumps could push it out.

The cofferdam flooded, and the men tried again to drive it down to firmer footing. Then the frame got hung up on the sheeting. In an effort to get it down, the men weighted the frame with extra sheeting. They knocked on the frame with the Mc-Kernan-Terry 9-B-3 steam hammer. They tried a couple of sticks of dynamite to shake it loose. They sent a diver down to find out where it was

hung up. He couldn't tell them. With a Vulcan 400 extractor, they pulled individual piles up a short distance to try to locate the trouble.

Finally, the contractor employed a diver to go down on the outside of the cofferdam and put sand bags in the hole to keep out the water. The contractor was able to hold water down long enough to clean up the footing and pass inspection. Then the contractor let the hole fill up and poured a full hydrostatic tremie seal 16 feet deep.

Frame built on barge

The first two rings of the frame for all the cofferdams were welded into a unit on pontoon barges alongside the bank. The largest members of the all-steel frame were 12-inch WF 79-

pound beams. All connections in the heavily struttured frame were made with Lincoln welding machines. After the unit was completed, it was floated into position in the river. Winches, mounted on the tops of the six spud piles, lifted the frame while the barges were pulled out from under it.

Forming

Heavy wooden forms were built in a work area on the south bank and carried by barge to the piers. The rounded sides of the columns were formed with $\frac{1}{4}$ -inch plywood backed with vertical 2×4 's placed side by side. The web and cap were formed with $\frac{1}{4}$ -inch plywood backed by a solid layer of 2×6 's. Framing the forms were 3×6 's backed by double 3×6 wales.

Ready-mix concrete, from the nearby Big Rock Stone & Material Co., was used for the piers. The transit-mix trucks rolled up to receiving hoppers that discharged through elephant trunks to the four 2-yard buckets resting on the barge below. The barge carried the buckets to the steam revolving crane that placed the concrete.

Personnel

The job was under the overall supervision of W. H. O'Donley, vice president of Massman. Sweating it out for Massman were H. E. Dumbell, superintendent, and Jerry Kar, assistant superintendent. The resident engineer for the state highway department was John Tallant.

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SPICER RUBBER ELEMENTS SOLVE YOUR TORSIONAL PROBLEMS

If you are faced with the problem of torsional vibration from impulses within the operating range, Dana engineers may be able to help you solve your design problems.

Spicer resilient propeller shaft assemblies have been used successfully for years in rapid transit cars, street cars, engine dynamometer, truck, bus, earthmover and passenger car applications to solve difficult torsional problems.

Spicer rubber-cushioned shafts make it possible for design engineers to "tune out" the vibration and thus produce commercially acceptable installations.

Spicer rubber-cushioned propeller shafts offer these additional advantages:

- 1** The torsional flexibility limits the effect of high impact loads resulting from rough shifts and other sudden torque changes.
- 2** The cushioning effect prevents clatter, rattle, and backlash noises.
- 3** Increased life of bearings, gear teeth, splines, and other components due to the reduction of high impact and torsional loads.
- 4** Reduction of noise transfer.
- 5** Axial flexibility to cushion forces resulting from length changes.



International 295 Payscraper, equipped with a Spicer rubber element shaft, at work on the Interstate Highway System.

Product knowledge and years of experience are available to you through Dana engineers to help solve your torsional problems. Contact them today.

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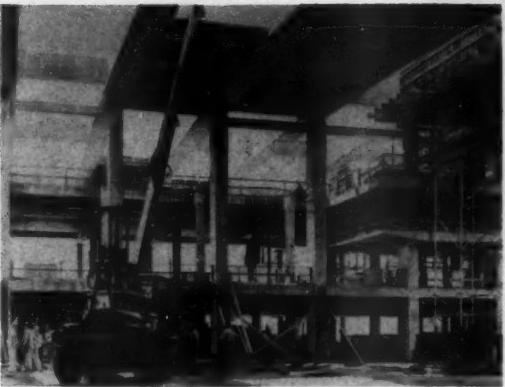
The 50-cent bulletin is available
from the HRB, 2101 Constitution Ave.,
Washington 25, D. C.

Value of chloride salt for melting ice, snow

Bulletin 220 from the Highway Research Board, "Ice Melting Properties of Chloride Salt Mixtures," contains two papers. The first discusses the results of a laboratory study of ice removal by various chloride-salt mixtures and includes a wheel test approximating highway traffic conditions.

The second paper describes field tests to determine the ice-melting properties and storage characteristics of chemical mixtures for winter maintenance. Tables, graphs, and pictures abound.

The 50-cent bulletin is available from the HRB, 2101 Constitution Ave., Washington 25, D. C.



In the new passenger terminal for Eastern Air Lines at New York's International Airport, 5-inch-thick precast and reinforced roof slabs are placed on 8-inch flanges cast integrally with girders. Workmen strip side forms from a newly cast girder, upper right. Plastiment retarded the set of concrete so that an entire 230-foot girder could be cast at one time.

Lightweight concrete cuts foundation costs on passenger terminal

The \$20 million passenger terminal building nearing completion for Eastern Air Lines at New York's International Airport will be one of the largest to date for any single air line. The major part of the roof of the 375 x 280-foot 3-level building rests on 16 massive slightly arched girders, which rise 9 feet at their centers and are supported by only three columns in the terminal's 230-foot width.

Subsoil conditions were so poor that it proved economical to use lighter concrete for the entire structure above the first-floor slab. The lightweight concrete weighs 110 to 116 pounds per cubic foot, compared to 150 pounds per cubic foot for ordinary-stone concrete, and this represents a saving in the dead weight of approximately 22 per cent.

The 8-foot-8-inch-deep girders that support the roof are spaced 15 to 18 feet apart and extend above it. Although only 126-foot spans were required to provide a column-free lobby, each of the 16 girders was cast for its entire 230-foot length, for it proved more economical to utilize a continuous girder supported on three columns. There is a column on either side of the 126-foot lobby and a third column to support the far end of the continuous girder, which cantilevers at both ends, 4 feet 5 inches beyond the third column and 15 feet 3 inches on the lobby side. An 8-inch-wide shoulder cast integrally with the girder along the bottom chord supports the 5-inch precast roof slab.

The use of Plastiment retarding densifier in the lightweight concrete mix kept the concrete plastic for about 15 hours, long enough so that the entire girder could be cast at one time without any portion of the concrete hardening prematurely. Each girder was cast in 10 to 12 hours without any cold joints in its interior, which would have caused planes of weakness.

Starting at both ends and alternating, crews filled the girder form with concrete through ports that were at two levels in the side of the formwork. As concrete was placed, it was vibrated continuously. This technique facilitated concreting, as the drops were limited to 6 feet in height. The 14-S reinforcing bars were butt-welded by the Thermit process. The soffit forms for the girders were mounted on traveling falsework, which was lowered and moved for each pour. The side forms, resting on the bottom forms, were positioned by cranes for each girder.

Specifications called for 3-day strengths of 2,500 psi and 28-day strengths of 3,000 psi. Frequent Swiss hammer tests were used to check on the concrete strength, and cylinders were broken regularly. Much of the 20,600 cubic yards of concrete was placed in the summer. During hot weather, the proportion of Plastiment was increased to one pound per sack of cement to offset the rapid rate of concrete hardening.

GIANTS CAN HELP YOU ON RESONANCE PROBLEMS



DANA CORPORATION

Toledo 1, Ohio

Serving Transportation — Transmissions • Auxiliaries • Universal Joints • Clutches • Propeller Shafts • Power Take-Offs
• Torque Converters • Axles • Powr-Lok Differentials • Gear Boxes • Forgings • Stampings • Frames • Railway Drives
Many of these products are manufactured in Canada by Hayes Steel Products Limited, Merrittton, Ontario

For more facts, use Request Card at page 18 and circle No. 258

NOVEMBER, 1959

NOBLE CENTRAL-MIX BATCHING PLANTS SPEED HIGHWAY & AIRPORT PAVING

500,000 cubic yards of concrete for the \$19,000,000 Chantilly International Airport, Washington, D. C., runway and taxiway construction represents the first paving job of this magnitude supplied from a central-mix concrete batching plant. C. J. Langenberg & Son, general contractor, producing 30 cubic yards of premix concrete in 4½ minute cycles, this particular NOBLE central-mix plant features:

① 600 barrel cement batching silo charged pneumatically. Overflow to two 7500 barrel storage silos, cement recirculated from storage to batching silo by two 12" vertical screws.

② 200 tons of rock and sand stored in 3 separate compartments charged by three 30" x 15.5 ft. NOBLE belt conveyors.

③ 5 automatic batchers in center section sub-assembly (3 for aggregates, 2 for cement) weigh materials simultaneously and accurately for a complete 10 yard batch. Push-button controls for batching and discharging into holding hopper. Automatic interlocks prevent batching to holding hopper with gates open. Extreme accuracy is assured by photoelectric "over-under" indicators of NOBLE beam scales and positive cut-off by automatic louvre gates on two high-speed cement feed screws.

④ Pre-blending of sand, aggregates, cement helps reduce subsequent mixing time to only 3 minutes. ⑤ 60" wide, 250 hp batch transfer conveyor alternately charges ...

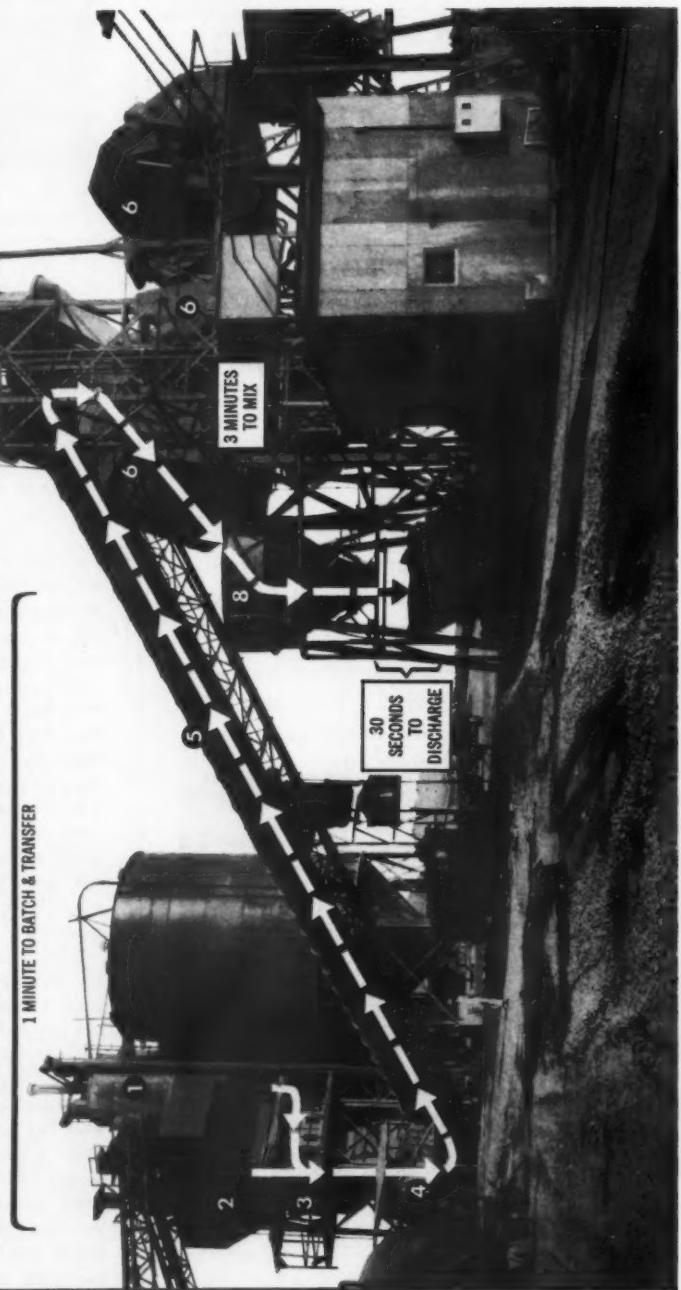
⑥ three 10 cubic yard Smith tilting mixers.

⑦ Water batching and distribution of dry materials from conveyor to proper mixer is controlled from tower. Water pumped up to scale from ground storage.

⑧ Three 20 cubic yard wet-mix holding hoppers provide 60 cubic yard reserve to avoid any delay in charging dumpcarts. 3 Dumpcarts can be charged simultaneously on 3 separate driveways.

Three drive-over truck hoppers for two aggregates and sand. Emergency stocks of aggregates and sand for front end leading to truck hoppers.

Pre-mix paving is daily gaining greater preference in airfield and highway construction. It reduces congestion at the paving site by eliminating pavers and water trucks and provides centralized control over concrete quality. NOBLE manufacturers complete batching and mixing plants for every size job . . . from single 3 cubic yard mixer plants to the high production multiple batcher unit with three 10 cubic yard mixers shown below. All NOBLE central-mix plants feature the factory sub-assembly, extreme portability and rapid erection typical of NOBLE transit-mix and dry-batch plants that have produced quality concrete at lowest cost per yard for over 30 years.



NOBLE COMPANY

1800-7TH ST., OAKLAND, CALIF. • TEMPLEBAR 2-5785

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CLEVELAND 13, OHIO-75 Public Square, Tower 1-0240
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Big equipment, modern methods help contractor . . .

Grade rugged canyon road



A P&H 1055 shovel loading a Euclid end-dump with rock works in one of the 40 separate rock cuts on a mountain grading job near Culdesac, Idaho. At this point, a new channel is being excavated for Lapwai Creek. In all, seven miles of channel change was required.

Grading 13.3 miles of mountain road on a new alignment through a narrow steep-sided valley became an especially difficult job when the contractor encountered solid rock in 40 separate cuts.

A railroad shares the lower reaches of the valley, and an unpredictable stream had to be controlled through seven miles of channel change, seven concrete bridges, and 1,850 feet of big culvert.

These were some of the challenges faced by contractor S. S. Mullen, Inc., Seattle, Wash., as his crews tackled the \$2,011,000 grading job through Lapwai Creek Canyon south of Culdesac, Idaho. The project, which will cut five miles from the old alignment and eliminate the many hairpin curves, was planned and supervised by the Idaho Department of Highways.

Fencing crews on horseback

Although there were big machines on this grading job, the fencing crew looked like the pioneers in a TV western as they left camp every morning with a string of pack horses. The horses carried posts, wire, and tools up the canyon banks to the right-of-way lines where the fence was being constructed.

A substantial part of the 26 miles of fencing on the project was placed under these primitive conditions, although the workmen were often within hailing distance of the equipment working on the grade below.

The Lapwai Creek route presents much more favorable grade and alignment than the old route, built in 1925, which winds up a mountainside in a series of switchbacks. However, until the development of present-day techniques and equipment, it was not feasible to attempt a highway construction project in the confines of the rugged canyon.

The new route is of 70-mph design with a maximum grade of 5½ percent. The 24-foot-wide pavement with 5-foot shoulders on both sides is being placed under a separate contract.

Mullen solved the many job problems, including that of making a profit, with the aid of big equipment and modern techniques. A pair of Euclid TS-24 twin-engine scrapers and a Caterpillar D9 pusher moved a big share of the 1,350,000 cubic yards of common excavation. A new P&H 1055 shovel fitted with a 3½-yard dipper loaded four Euclid 22-ton end-dumps to move a portion of the 500,000 cubic yards of solid rock. Three D9's with rippers and dozers moved the remainder of the rock.

To avoid the dangers inherent in

→ For more facts, circle No. 259

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NOVEMBER,

A Euclid end-dump hauls rock to a fill area, where the material is shaped and compacted by a D8. One of the big problems on the job was getting rock-free fine material to bed and cover the Armco Multi-Plate culverts that carry the creek under the new grade.



shoring and forming in the stream bed for the seven concrete bridge decks, the contractor precast all of the girders and then set them in place on the piers. All of the bridges were skewed, yet they were identical in design. This feature made precasting especially advantageous. The 3-span structures had spans of 30, 40, and 30 feet. Abutments on the approach fills were supported on spread footings, while the piers were founded on spread footings well below stream bed.

High-lead logging

The upper reaches of the canyon were heavily timbered, and the contract required 430 acres of clearing. Since the slopes were too steep for tractors, this area was logged by the high-lead method. Tractors handled this shore in less rugged areas, and a Bucyrus-Erie 22-B logging crane decked the logs.

A partial list of rigs working on the canyon project:

Euclid TS-24 scrapers
Euclid S-18 scrapers
Cat D6, D8, and D9 tractors
Cat and Ateco tractor-rippers
P&H 1055 shovel
American 375 truck crane
Euclid 22-ton end-dumps
Bucyrus-Erie 22-B logging crane
Hyster grid rollers
LeTourneau-Westinghouse and
Bucyrus-Erie sheepfoot
rollers
Ingersoll-Rand Crawl-IR drills
12 600-cfm Gyro-Flo compressors

Without waiting for spring, the contractor moved his drilling crews and the P&H 1055 shovel into the rock cuts and began taking out some of the cuts and making some of the channel changes. Those cuts that could be economically handled by the dozers were bypassed as the shovel and "Eucs" worked their way down from the upper end of the canyon.

Last winter, the drilling crews went back to drill and shoot these bypassed cuts, and the three D9's moved the rock. Two of the D9's had Cat rippers; the other had an Ateco ripper. To work as a team, the Cats were equipped with three types of dozers. One had a straight dozer, one a U-dozer, and the other an angledozer. These rigs moved the shot rock an average distance of 300 feet and almost always downhill. All of the 40 rock cuts daylighted into the canyon on one side.

Slide causes trouble

When weather and soil conditions permitted, the scraper spread moved into the lower reaches of the valley where most of the common excavation was located. This was a nearly routine high-speed earthmoving op-

(Continued on page 19)

**1,500,000 TONS
DRIED IN 3 YEARS**

in this Simplicity DOUBLE SHELL Dryer

"This dryer is one of the best pieces of equipment we ever bought"

comments one of the top production executives of National Cement Company, Birmingham, Alabama.



Operated 24 hours a day, this compact Simplicity double shell dryer has dried around 500,000 tons each year for the past three years . . . 1,500,000 tons and still operating efficiently. How many single shell dryers have produced half this tonnage before they had to be replaced?

The Simplicity dryer was originally bought to supplement the production of their two single shell dryers. It soon proved that the one Simplicity double shell dryer did the whole job with less effort, far lower fuel cost and a maintenance cost of less than 3c a ton. The single shell dryers have now been on stand-by for three years.

This standard Simplicity double shell dryer outperforms custom units costing several times as

much. It has proven itself in drying all types of mineral aggregates, crushed stone, slag, portland cement, silica sand, sand and gravel. This double shell dryer is noted for its fuel economy. The cold incoming material in the outer shell is partially dried by the heat that is normally wasted in a single shell dryer. This saves fuel and protects the dryer from the destructive effects of heat.

The furnace gases enter the Simplicity dryer around 2500°F. to 3000°F. Actual exhaust temperatures measured at Douglasville, Georgia, on a hot day in June 1959 was 180°F. The heat goes in the material and not in the air. That is why fuel savings are so dramatic . . . in many installations fuel savings alone will pay for the dryer in three years or less.

Detailed specifications sent on request.

DEPENDABLE

THE SIMPLICITY SYSTEM

FROM BUYER TO BUYER
BETWEEN MEN WHO KNOW

THE SIMPLICITY SYSTEM CO.

1018 AVENUE
CHATTANOOGA 6, TENNESSEE
PHONE MARion 2-2144

For more facts, use Request Card at page 18 and circle No. 260

on three construction projects, three contractors testify...

U-L TOWERCRANES SAVED \$90,000.00 AND 5-MONTHS TIME

in CHARLOTTESVILLE



"I am glad to report that my company saved approximately \$40,000 and 30-days on one construction project of the new Hospital Building at the University of Virginia, using our new Universal-Liebherr Towercrane," says Raymond V. Long, Jr., first vice president, IVY CONSTRUCTION CORP., Charlottesville, Va.

"This U-L Towercrane saved us \$15,000 and 40-days on our first job with it," says A. L. Cohen of AL COHEN BUILDER, Denver 4, Colo.

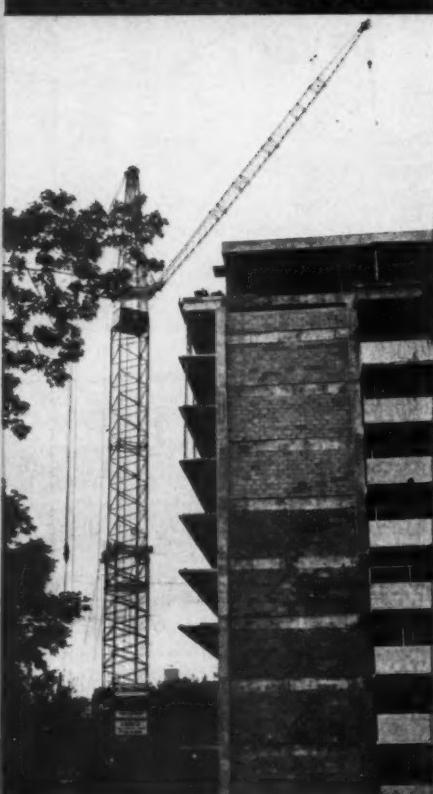


"My company saved 3-months and \$35,000 due to the increased efficiency and low operating costs of the U-L Towercrane," says Leo A. Wexler, president of WEXLER CONSTRUCTION CO., INC., Newton 61, Mass.

in BOSTON



in DENVER



To find out how Towercranes can do this, contact:

UNIVERSAL-LIEBHERR, INC.



AFFILIATE OF UNIVERSAL MANUFACTURING CORP.
TOWERCRANES • GANTRY CRANES • HYDRAULIC EXCAVATORS • AUTOMATIC BATCH PLANTS
ZELIENOPLE 1, PA. • PHONE ZELIENOPLE 100

For more facts, use Request Card at page 18 and circle No. 261

(Continued from page 17)

eration until a huge slide suddenly developed on one hillside. The entire hillside moved down, displacing the railroad grade slightly and boiling up into a ridge on the far side of the tracks.

Lateral drains

The grading stopped in this area, while lateral drains were installed in an attempt to stabilize the hillside and the grade was revised to lessen the weight on the slide. Later, the engineers moved back in and completed the grade in this area without further difficulty.

The common excavation was not strictly earth; it contained a great deal of loose and broken rock, which the D9's ripped ahead of the loading operation. To compact this material into satisfactory fills, the contractor used two Hyster grid rollers and three LeTourneau-Westinghouse and Bucyrus-Erie triple-drum sheepfoot rollers.

Big culverts

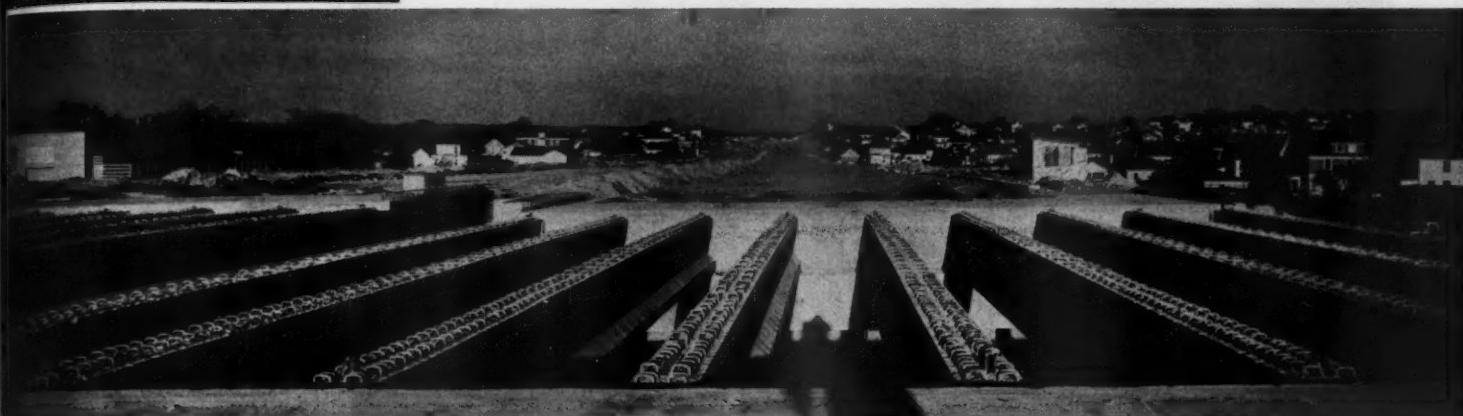
In the upper reaches of the canyon where the stream was not so large, it was carried under the new grade in a series of Armco Multi-Plate culverts,

(Continued on next page)

Compaction of common excavation in roadway fills was done by a Bucyrus-Erie triple-drum sheepfoot roller pulled by a D6. Grid rollers were also used on the fills.



PRESTRESSED CONCRETE REPORT



Bridge job showing New England Concrete Pipe Corp. concrete girders constructed with $\frac{3}{8}$ " Leschen Prestress Strand. Each

seven-wire strand has a tension of 7 tons for a total 340-ton squeeze of prestressed force in each girder.

NEW ENGLAND CONCRETE PIPE CORPORATION USES LESCHEN PRESTRESS STRAND

"Leschen is a prime contributor to our product and market position... we regard Leschen service as excellent"—R. A. Bierweiler, Vice President, New England Concrete Pipe Corporation.



The New England Concrete Pipe Corporation has built 200 bridges of prestressed concrete in the past six years. One of their most recent jobs pictured here under construction is the Broadway Bridge, one of nine bridges on the East Providence Expressway, between Providence and East Providence, R. I. The Broadway Bridge required eighteen girders, 45" in depth, measuring 67'2" in length and weighing 20 tons each. Owner: State of Rhode Island. Design engineer: Chas. A. Maguire & Associates, Providence, R. I.

New England's largest concrete prefabricator, New England Concrete Pipe Corp. uses wire strand at a rate of 20,000 feet daily; and can be truly considered experts on wire strand quality. Quoting their Vice President, Mr. Bierweiler, "It is obvious that a public project, subject to inspection by the State of Rhode Island and usage by literally millions of citizens, must meet the most exacting and rigid standards, and must be constructed in accordance with the most advanced engineering techniques and products. We have selected Leschen

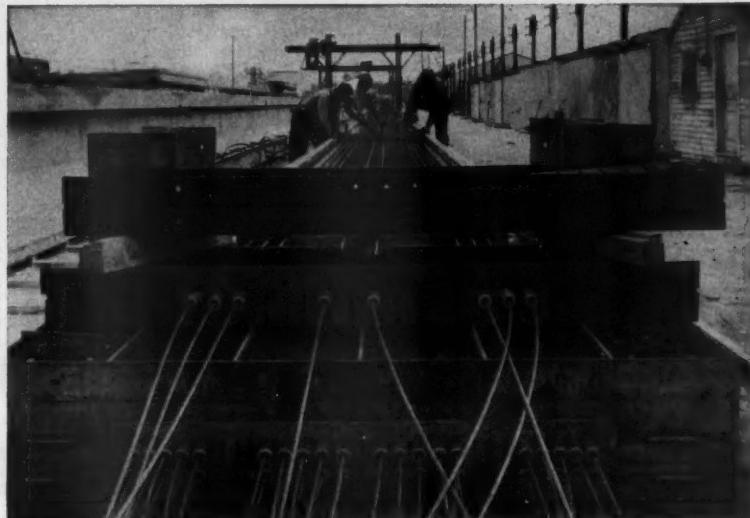
Strand for our prestressed concrete box girders in keeping with this standard of quality."

If you would like to talk with a Leschen engineer or receive complete specifications on Leschen Prestress Strand, write to: *Leschen Wire Rope Division, H. K. Porter Company, Inc., 2727 Hamilton Avenue, St. Louis 12, Missouri.*



Mr. Bierweiler, and Mr. A. Rossi, Prestressed Concrete Foreman, inspecting Leschen Prestress Strand. According to Mr. Bierweiler, "We apply 14,000 pounds tension on each Leschen strand combined with 6,000 p.s.i. concrete. The result is maximum resilience and basic strength."

For more facts, use Request Card at page 18 and circle No. 262



End view of one of five New England Concrete Pipe Corp. casting beds. Stressed with Leschen Prestress Strand.

LESCHEN WIRE PORTER ROPE DIVISION
H. K. PORTER COMPANY, INC.

PORTER SERVES INDUSTRY: with Rubber and Friction Products—THERMOID DIVISION: Electrical Equipment—DELTA-STAR ELECTRIC DIVISION, NATIONAL ELECTRIC DIVISION; Specialty Alloys—RIVERSIDE-ALLOY METAL DIVISION; Refractories—REFRACTORIES DIVISION; Electric Furnace Steel—CONNORS STEEL DIVISION, VULCAN-KIDD STEEL DIVISION; Fabricated Products—DISSTON DIVISION, FORGE AND FITTINGS DIVISION, LESCHEN WIRE ROPE DIVISION, MOULDINGS DIVISION, H. K. PORTER COMPANY de MEXICO, S. A.; and in Canada, Refractories, "Dissler" Tools, "Federal" Wires and Cables, "Nepco" Systems—H. K. PORTER COMPANY (CANADA) LTD.

(Continued from preceding page)



The bulk of the common excavation on the project was handled by Euclid TS-24 twin-engine scrapers, push-loaded by Cat D9 tractors. Most of this work was in the lower reaches of the valley.

some 11 feet in diameter and others 9.5 feet high and 15.33 feet wide. A total of 1,850 feet of these culverts was installed at the several locations.

In this rocky area, one of the real problems was to find rock-free material for bedding and backfilling the pipes. Since the roadway cuts and channel changes were almost entirely rock, the dirt had to be hauled as much as four miles by truck. As soon as the pipes had a foot of cover to protect them, the rest of the fills were built of rock.

The project manager in charge of the work for S. S. Mullen, Inc., was

Harry Claterbos, Jr. On his staff were project engineer Ray Senior, general superintendent Oscar Mannon, grade foreman Troy Carter, office manager John Kelley, and master mechanic Ray Dell.

On the job for the Idaho Department of Highways were resident engineer Don Cox, chief inspector Glen Evans, and project chief Don Aldridge. The district engineer of the Lewiston District, in which the project is located, is Phillip A. Marsh. The construction engineer for the Idaho Department of Highways is A. P. Rath.

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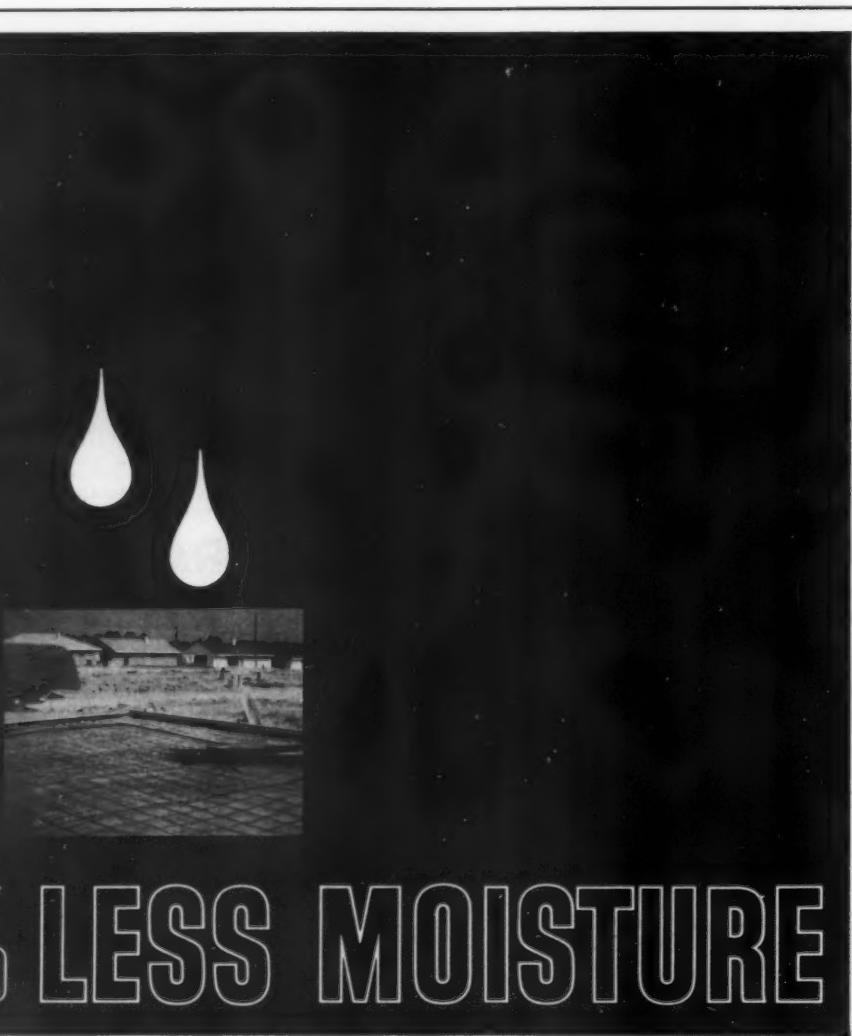
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31% LESS MOISTURE

By actual laboratory test

31% less water vapor passed through **Casey Elastibord Vapor Stop** than through any other vapor seal material.

After 672 hours of vapor transmission testing, Carey Elastibord proved it would stop 31% more water vapor than the next best vapor barrier. Here is protection under poured slabs that you know will stop the damaging effects of vapor transmission—floor buckling, slab cracking, paint chipping and plaster cracking. Unbiased laboratory reports rate Carey Elastibord Vapor Stop at .00807 perms*, a full 31% better than the next best.

Rugged, Yet Flexible—Elastibord's flexibility enables it to conform to the grade contour. This characteristic, coupled with Elastibord's natural ruggedness, results in a tough, impermeable shield that dependably withstands the heavy abuse that occurs during the pouring of the slab.

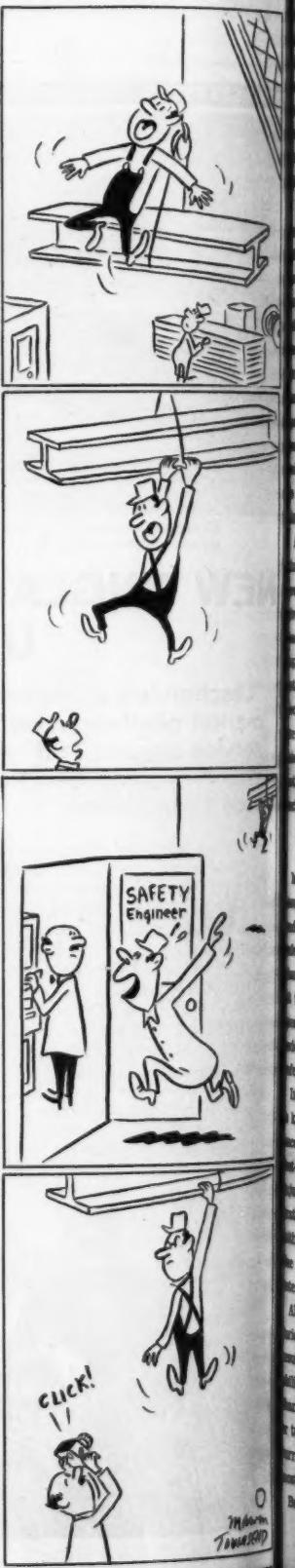
Permanent Protection—Elastibord is permanent, giving unfailing moisture protection. It's easy to handle, install and seal. Furnished in 3 foot width with 8, 10, or 12 foot lengths; either $\frac{1}{8}$ " or $\frac{1}{4}$ " thick. Lay it on a graded, tamped surface, lap 6" and seal with Carey Elastibord Cement, a tough asphalt adhesive.

With Carey Elastibord Vapor Stop, you have a rodent and termite-resistant moisture barrier of unmatched quality. See your Carey dealer or write for Form 6307.

*1 perm = 1 grain water through 1 sq. ft. of material per hour at vapor pressure differential of 1" mercury.

THE PHILIP CAREY MFG. COMPANY • LOCKLAND, CINCINNATI 15, OHIO

For more facts, use Request Card at page 18 and circle No. 263



Safety Department:

General functions

though the majority of the larger construction projects employ a safety engineer, it is usually the superintendent who is the safety engineer on smaller projects. The safety organization ordinarily also includes provision for and inspection of job sanitary facilities, as well as responsibility for protection. Plant guarding and other policing responsibilities are usually the function of the industrial relations division.

Undoubtedly the best method for insuring accident prevention on the job is through either groups of workers or foremen who have direct contact with the men. Safety committees do not always have the knowledge of the strength of materials or their use in designing safe temporary structures. The basic responsibility for this rests on the superintendent or safety engineer, since they have the requisite training available to make the required calculations.

A safety committee should be constantly on the watch for means to prevent accidents and should be given the opportunity to meet at least once a week along with the superintendent, safety engineer, or both. At that time, all matters connected with the problems of safety are discussed and plans are formulated to correct conditions that are at fault. An hour is ample time for such a meeting.

Insurance inspection

Most insurance companies which insure for workmen's compensation and public liability have their own safety engineers, who visit construction projects and report on them. At the same time, these men are of great assistance in pointing out hazardous conditions and in formulating safety programs on the job.

Insurance rates are based on what is known as the contractor's experience record, which is a record of lost-time accidents, including fatal ones. When a contractor is in operation over a considerable period with no lost-time accidents, he is in what is known as the minimum rate.

All accidents, diseases, and injuries arising out of employment and resulting in death, permanent disability, or in the loss of time other than the remainder of the day, shift, or turn on which the injury was incurred are required to be reported in writing.

But if a man is hurt any time on the job, he must report it immediately.

(Continued on next page)

For more facts, circle No. 264.

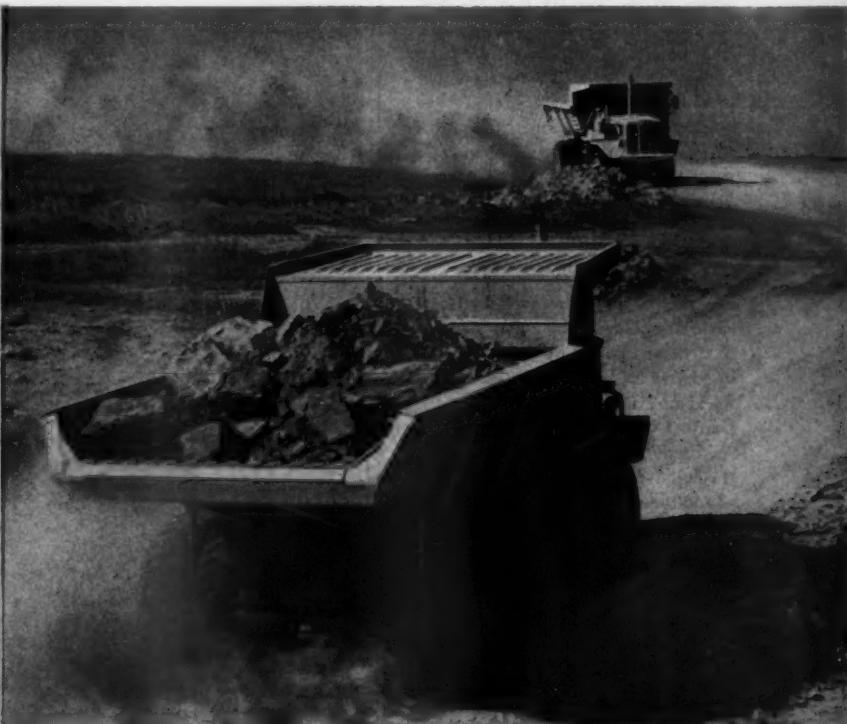


This is the forty-eighth of a series of articles on Construction Management by George E. Deatherage, P. E., National Schools of Construction, Satsuma, Fla. The articles are based on an eight-volume "Manual of Advanced Construction Management" published by George E. Deatherage and Son, Construction Consultants, Satsuma.

by GEORGE E. DEATHERAGE, P. E.
construction consultant

Walker Cut Stone Co., Milford, Kansas, replaced six smaller overworked gasoline haulers with only two 19-ton Model 65 Payhauler trucks! Their "65's" deliver 150 tons of limestone per hour, from quarry to crusher.

How new
rock-ribbed
65
Payhauler®
pair



speeds "write-off," replacing **six smaller rigs!**

—for Walker Cut Stone Co., Milford, Kansas

Two new International 19-ton 65 Payhauler trucks —with the new weight-saving corrugated bodies, and the new 250-hp D-817 diesel engine—have replaced six smaller gasoline trucks for Walker Cut Stone Co., Milford, Kansas.

Results are amazing! Only two operators instead of six to pay! Only 40 gallons of low-cost diesel fuel used daily (total) by the two Payhauler rigs—against several times 40 gallons of high-priced gasoline formerly swilled by the carbureted outfits! And only two machines to maintain, instead of six! "Write-off" of the Payhauler investment speeds in "high gear!"

Payhauler features increase capacity!

Even against competitive haulers of similar rated

capacity, the new 65 Payhauler gives you overwhelming advantages!

Of all off-road haulers in its size class, only the 65 Payhauler has the International-developed rock-ribbed corrugated body! This strength-multiplying principle lets the "65" shed 5,000 lbs. of power-wasting weight, and gain a full ton of payload capacity.

Prove the power-to-payload advantages the new rock-ribbed 65 Payhauler delivers! Compare the "65's" cycle-speeding combination of air-assist shifting; 11-second dumping, fast reversing; super-power braking; bonus-leverage, vibration-free power steering! And for 27-ton capacity, note how the 375-hp "95" leads the field. See your International Construction Equipment Distributor for a demonstration!



In only 11 seconds you dump the "65's" 19-ton load—with 3-stage, double-acting, constant-power hoist! Positive up-and-down snubbing guards against impact!



**International
Construction
Equipment**

International Harvester Co., 180 North Michigan Avenue
A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors... Self-Propelled Scrapers and Bottom-Dump Wagons... Crawler and Rubber-Tired Loaders... Off-Highway Haulers... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.

(Continued from preceding page)

Wednesday, whether at 8 a.m. or 5 p.m., and returns to work Thursday morning without any permanent injury, the accident is not counted. For rules and regulations that apply where you are working, consult the State Industrial Commission.

The workmen's attitude toward safety depends on the attitude of the foreman. If he is indifferent, the men will be indifferent. But if he believes in safety, if he convinces the men that he is in earnest and is doing everything in his power to protect them, the men will adopt his attitude.

A good foreman is the best safety device on the job. He does his best work in this respect by showing the men how to do things rather than telling them. It is his responsibility to see that no unsafe practices or conditions exist on any part of his job, to instruct new men in safe practices, and to see that all accidents are properly reported and taken care of.

Safety manuals

Safety manuals are available from various organizations. Every superintendent and potential superintendent is advised to secure the "Manual of Accident Prevention on Construction" from the Associated General Contractors of America, Inc., 20th and E Sts. N. W., Washington, D. C.

Additional safety reference material that may be valuable includes "Safety in Electric and Gas Welding and Cutting Operation," American Welding Society, 33 W. 39th St., New York City, N. Y.; The "Blaster's Handbook," E. I. du Pont de Nemours Co., Explosives Division, Wilmington, Del.; "American Standard Safety Code for Building Construction," American Standards Association, 70 E. 45th St., New York 17, N. Y.; and pamphlets put out by the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Insurance policies

Insurance against injuries to employees is compulsory by state law and is in accordance with the laws of each state. Insurance against injury to the public is not covered; this is provided for by insurance taken out with some insurance company licensed to operate within the state in which the work of construction is being done. Such a policy is ordinarily written to insure not only against injuries to persons but against property damage as well.

The state does not require by law that a contractor shall carry public-liability insurance, but standard contract documents or any well written contract requires that the contractor shall carry such protection. If the contractor is not covered by public-liability insurance, or if he permits his subcontractors to operate without it, then of course he is directly liable to extended suits for damages that might well bankrupt him. Charges for such insurance are reasonable, and the premium cost should be covered in the estimate under job

overhead. The 10 per cent of the labor figured in the estimate will usually cover both workmen's compensation, public liability and taxes, Social Security, etc.

On many large construction projects, it is customary to place the responsibility for fire protection and fire insurance in the hands of the safety engineer. He is in charge of keeping the job clean for safety purposes (and elimination of fire hazards can be done effectively at the same time and by the same forces); having the safety committee make

it their duty to cover such conditions in their inspections and reports; and organizing and directing fire-fighting forces.

On many large projects, where plant guards are maintained, it is usual to place the fire-protection facilities under the jurisdiction of the chief of guards. The need for the contractor to maintain fire insurance on a construction project will be guided by the type of contract in force. If the contractor is operating under the standard documents of the American Institute of Architects, he will be guided by the general conditions of the contract, in which the owner

effects and maintains the fire insurance.

When the clause is read carefully and interpreted correctly, it will be noted that the owner's policy excludes certain "scaffolding, staging, towers, forms, and equipment as are not owned or rented by the contractor, the cost of which is included in the cost of work." In addition, it definitely excludes tools owned by mechanics, cook shanties, bunk houses, or other structures for housing the workmen, the cost of which is not included in the cost of the work.

The purpose of this is to exclude

VERSATILITY SPEED ADD UP TO TOP PRODUCTION

HYDRAULIC TRACK ADJUSTERS standard on the No. 977 and No. 955—optional on the No. 933. An ordinary grease gun is all that's needed to adjust tracks. Just open the inspection door and apply a few strokes. The hydraulic cylinder does the rest.

SMOOTH-FLOW BUCKET CONTROL LEVER. The inside lever is pulled back, lifting the load. It locks in this position until it is kicked out at maximum height by the lift cylinder and linkage. After dumping, both levers are pushed forward. The bucket lowers but only tilts back to an adjustable, preset digging position. Linkage then kicks the outside lever, stopping the bucket tilt.

LIFETIME LUBRICATED ROLLERS. They need no lubrication until rebuilding. Heat-dissipating oil lubricant is retained by floating-ring seal. Eliminate on-the-job roller lubrication. Machines on-the-go for longer periods of time.

EXCLUSIVE CATERPILLAR OIL CLUTCH... the advanced clutch design offered. Provides up to 100 hours without adjustment. This is equal to months of "adjustment-free" operation. And because rate of clutch wear is slight, down time for repair is almost eliminated.

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some with title resting in the contractor. For instance, if a contractor should temporarily place a \$20,000 shovel on the job, it would seem impractical and unreasonable for the owner to be compelled to take out fire insurance on this equipment. The contractor must have this insured in his name, protecting him against loss by fire and associated contingencies.

This applies to lump-sum contracts, using the standard AIA contract documents for this type of contract. The situation alters in some respects if it is a cost-plus or fee contract. For instance, small

tools are purchased by the owner, either new or at a reduced price for used items from the contractor, and charged to the job. As such, the title rests in the owner and not in the contractor. Scaffolds, bunkhouses, cook shanties, etc., are constructed from materials bought in the name of the owner and erected with labor paid for by him in accordance with the contract terms. The net result of this is that the title is vested in the owner, can be capitalized as part of the cost of the work, and covered by his fire-insurance policy.

In these cost-plus contracts, the contractor is the agent of the owner,

and equipment rented under this contractual relationship becomes part of the cost of the work and would be covered by the owner's policy. It is axiomatic that the insurance on an item should be carried by the individual, partnership, or corporation in which the title rests. If the owner has title, he should insure; if the contractor is the owner, he insures.

When contracts and subcontracts are written, these situations must be fully realized and covered for all contingencies. The danger of using short, incomplete contract forms is that they omit stating who is responsible

for this insurance; in case of fire, the contractor, if not covered, may be subjected to serious loss and a setback in the work.

Endorsements

Several endorsements can be added to insurance policies. A builder's risk-extended coverage covers a building in the course of construction, together with such additions, attachments, and all permanent fixtures belonging to or constituting a part of the building. The coverage extends to a space within 100 feet of the building. If this condition is altered, a separate endorsement will be needed to broaden such coverage.

Protection against vandalism and malicious mischief can be secured by a special endorsement. However, this excludes glass breakage or loss by theft, which need separate endorsements.

Builder's risk endorsement covers damage to equipment on the site, but it does not cover such items as floating equipment, which is covered by an equipment floater form. A similar policy can be secured for land equipment, owned by the contractor, that is being used from job to job as necessity demands. This is known as a scheduled property floater policy. The insurance is void if equipment is overloaded. The superintendent or safety engineer should realize this and see to it that loads are kept within the manufacturer's stated limits.

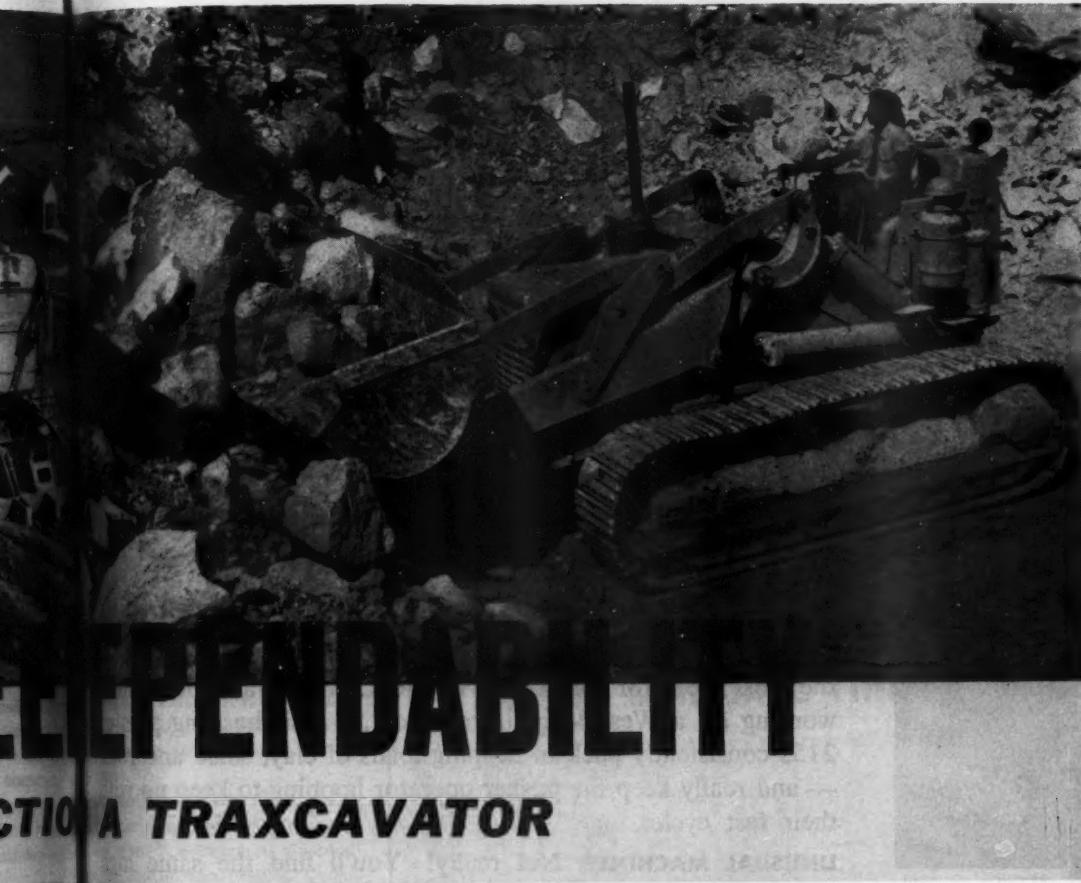
Generally, insurance premiums are cheap when the protection is fully realized, and complete coverage from all angles should be had on every job. If one has the information, it is a simple matter to cover premium costs in the estimate so that each job stands on its own. Handling it on the estimate in this manner means that premium costs do not have to be paid from fixed overhead accounts or profit.

AIA policies

In order to clarify and cover the insurance coverage on work under construction, the AIA and the AGC have jointly agreed upon a recommendation form of Builder's Risk Policy of a type that by future endorsements can be turned over to the owner as covering the completed structure. Its purpose is to eliminate the routine work involved in the usual monthly reporting type of policy and the risk of inadequate coverage if the routine fails and accurate monthly reports of progress are not made.

The new Builder's Risk-Completed Value Form, which relates solely to fire insurance, makes it possible for the entire risk for the life of the job to be covered by a single policy taken out by the owner at the beginning of the work. A principal condition is that the total amount of insurance shall equal the completed value of the building, as estimated for insurance purposes, and exclude all work not subject to fire damage. If the total amount of insurance is found to be less than the completed

(Continued on page 25)



DEPENDABILITY ACTION A TRAXCAVATOR

FOR THE JOB . . . whatever the conditions . . . a Caterpillar-built Traxcavator to take charge. Our design has given this machine a reputation for efficiency . . . low operating and maintenance costs. For this is a digging and loading tool; no tractor attachment.

Line is complete. You get top production from Traxcavators . . . the No. 933—52 HP, 1½ cu. yd. bucket; the No. 955—70 HP, 1½ cu. yd. bucket; the No. 977—100 HP, 2¼ cu. yd. bucket. And there's a complete range of quick-change attachments . . . buckets, bulldozers, forks, the exclusive side bucket and the rear-mounted ripper.

Traxcavators are built to last. They have a heavy main frame, welded into a one-piece unit. Box section track roller frame absorbs the loads and strains of tough treatment. Lift arms are made to stand up under the strain of heaviest digging conditions.

Traxcavators give you fast action and ease of operation. Excellent stability and balance give better control of the machine. A fast hydraulic system cuts cycle

time and increases maneuverability even in close quarters. Visibility is excellent. The high seat puts the operator on "top" of the work. Operator's compartment is uncluttered. Tractor controls are conveniently located for handling ease. Bucket controls are at the right armrest . . . closely spaced for dual operation with one hand.

The reliable Caterpillar Diesel Engine has a fuel-saving injection system and ability for hard lugging. Each engine is matched to the machine for power and bucket size.

All of these features pay off in top production. Let your Caterpillar Dealer help you choose the Traxcavator best suited for your job. Get production facts and figures. And ask for a demonstration.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR

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BOOST PRODUCTION
AND LOWER COSTS WITH
A VERSATILE TRAXCAVATOR

For more facts, circle No. 265

YARDS AHEAD

PRODUCTION COVERS



CURTISS-WRIGHT MODEL

215

CW-215 SELF-PROPELLED SCRAPER

Capacities: 15 cu. yds. struck, 21 cu. yds. heaped, 42,000 pound rated load

SALES • SERVICE • PARTS

at your

CURTISS-WRIGHT DISTRIBUTOR

HEAPS IN A HURRY — cuts minutes from the miles . . . That's why the Curtiss-Wright CW-215 moves the most dirt — makes the most profit for contractors like R. C. Wetherall, shown here working on a West Virginia road job . . . This hustling pair of 215s consistently pack in heaping loads of clay, shale and rock — and really keep the pusher operator hopping to keep up with their fast cycles.

UNUSUAL MACHINE? Not really! You'll find the same high performance in the entire CW line — from the 7 cu. yd. CW-27 to the big CW-226, largest two axle scraper on the market. Check any model against your job requirements . . . put "Yards Ahead" performance to work for you.

AD NO. 82-48



SOUTH BEND DIV. CURTISS-WRIGHT CORPORATION, SOUTH BEND, INDIANA

SOUTH BEND DIVISION

CURTISS-WRIGHT

CORPORATION
SOUTH BEND, INDIANA

For more facts, use Request Card at page 18 and circle No. 266

the owner becomes a co-insurer to that extent. If extra work is added, the insurance company should be notified and an extra premium paid as if the extra value had originally been included. When desired, the amount of insurance required under this form may be placed with two or more companies.

The premium, applied to the amount of the policy, will be at the appropriate rate taken for a one-year period. The premium can be adjusted if construction will be for more or less than a year.

If fire occurs, the amount of loss will be automatically reinstated and an additional premium charged on the original basis for the balance of the period.

The policy is applicable only during construction, and it is useful whether work is being done under a single general contract or under a number of separate contracts. It is the basic condition of the policy and its adjusted rate that it is to be taken out at the beginning of work, when the first material is delivered at the site of the job.

This type of policy is not intended for usual residential construction, which is generally covered with a permanent policy for three or five years with right to complete the work elsewhere.

If the contractor so desires, such items as tools and equipment can be insured under this new form of coverage by means of a rider that will indicate the estimated value and the premium involved. This special coverage can be secured at the request of the contractor. But it will be at his expense, as it is insurance of a capital value that is in no way a part of the cost of the building. The owner is responsible for insurance of the structure.

Information on this type of policy can be had from the AGC; The Secretary, AIA, The Octagon, Washington, D. C.; or the nearest Underwriters Association.

An liability and workmen's-compensation insurance premiums are based on trades classifications, the amount of money expended on payrolls for each of these classifications must be calculated and summarized in a report to the insurance carrier. This report can cover all jobs under way and, if a cost system is in effect, the values can be quickly ascertained from this source.

(Next month's article will deal with Safety Department: Sanitary code, first aid, and safety rules.)

Koehring-Waterous names

Tom McGill, Allen Climan, and Ted Nicholson have been named district representatives for Koehring-Waterous Ltd., Brantford, Ont., Canada, a subsidiary of Koehring Co., Milwaukee.

McGill will cover the province of Ontario; Climan, the provinces of Quebec, Newfoundland, and the Maritime; and Nicholson, the provinces of British Columbia, Alberta, Saskatchewan, and Manitoba.

For more facts, circle No. 267 →

U. S. Steel subsidiary to aid Quebec project

■ Quebec Cartier Mining Co., Montreal, Que., Canada, a subsidiary of U. S. Steel Corp., Pittsburgh, has completed arrangements with a group of American and Canadian banks for the establishment of a credit that will enable the company to borrow up to \$200 million in U. S. dollars between now and December 30, 1960.

The money will be used to assist in the development of the project to mine iron ore in the Lac Jeannine area in Quebec. That project in-

cludes construction of a new harbor and loading facilities at Port Cartier, a 193-mile railroad from Port Cartier to Lac Jeannine, a 60,000-hp hydroelectric plant on the Hart-Jaune River, and the preparation of a large open-pit mine and concentrator for the annual production of 8 million tons of iron-ore concentrates.

Hobart names manager

■ Robert E. Roediger has been named manager of electrode sales for Hobart Bros. Co., Troy, Ohio. He was formerly a district representative in the southeastern states.

New Euclid plant in full production

■ Production of two crawler-tractor models is now underway at the new Hudson, Ohio, plant of Euclid Division, General Motors Corp., Cleveland. Located on a 400-acre site, the plant has a floor area of 662,000 square feet.

Euclid is beginning construction of a new parts office and warehouse building adjacent to the new crawler-tractor plant. The new building will contain approximately 335,000 square feet of office and warehouse space for the company.

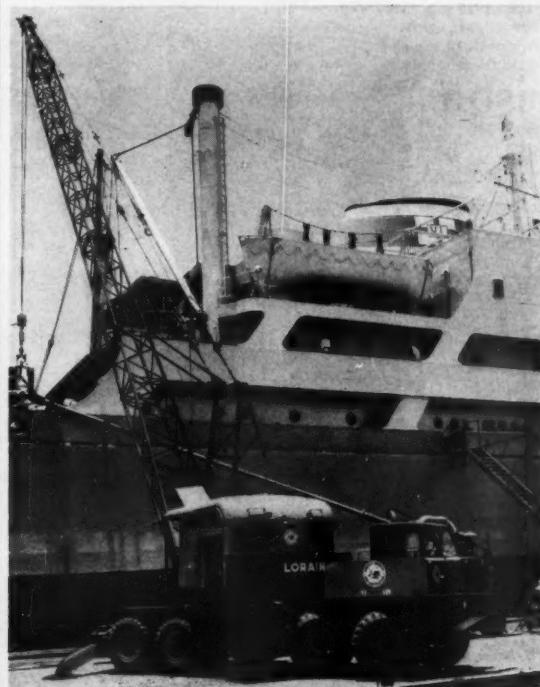


Pile driving in Wisconsin. Bridge Builders, Inc. depends on the positive leveling of Power-Set Outriggers on the MC-530 Moto-Crane to drive 120-foot piles through a lake bottom.



In a California oil field. Valley Crane & Rigging Service set up their Power-Set Outriggers faster than the load can be hooked on. Their 35-ton Lorain Moto-Crane unloads a 30-ton mud pump.

YOU TOO CAN SAVE TIME WITH POWER-SET OUTRIGGERS



On the docks in Hawaii. Hawaiian Dredging & Construction Company uses Power-Set Outriggers to set up fast. Here the Lorain MC-530W Moto-Crane handles a grain unloader to empty a freighter with speed and efficiency.

Set four outriggers in less than a minute . . . take only 20 seconds to retract to an 8-inch clearance for fast move-ups . . . automatically adjust to uneven ground. These are just some of the ways Lorain's exclusive Power-Set Outriggers will speed your operations.

Here's how Power-Set Outriggers pay off all over the country. From New York: "We waited over half an hour while a competitive crane at the other end of a big lift set outriggers. We were ready in seconds." From Minnesota: "We saved 45 minutes on former set-up time on a side hill job." From Pennsylvania: "We have always used crawler machines because we wouldn't bother setting outriggers. Now it's Lorain Power-Set Outriggers for us."

Ask your Lorain distributor to set up a demonstration.

THE THEW SHOVEL COMPANY, LORAIN, OHIO



Each curved outrigger beam is independently controlled and hydraulically powered to move out and down simultaneously. Positive wedge locks automatically take over when beams are positioned . . . no hydraulic pressure needed to hold beams securely.

LORAIN. ON THE MOVE



A cutaway of a construction plan for Grand Central City, which will replace New York City's Grand Central Terminal Building, illustrates how foundation and steel work will advance from the subsurface, piercing through the railroad structure even before the old Terminal Building is dismantled. New steel is erected to support the structure's tower section, existing columns will remain to support the base section.

Construction, demolition to be done simultaneously for New York skyscraper

The 55-story Grand Central City, an office building that will sprawl over 3½ acres of midtown New York City, has given rise to a demolition-construction blueprint that bypasses conventional methods. Crews working on footings, foundations, and steel will start pulling the Grand Central City upward from a depth of 55 feet below street level before the torch and crowbar men start dismantling the old Grand Central Terminal Building.

A 2-stage operation will get the new building out of the ground. The 8-story base section will rise directly from street level, resting on the same columns that have supported the old terminal building. While the latter structure is razed, and prior to construction work on the base section, footings and foundations will go forward for the octagonal tower. Base and tower will mesh as the overall structure pushes out of the ground. The ground-floor construction of the original building will remain intact as a storage deck for materials and as a protective umbrella for the subsurface railroad structure and new foundations.

The new tower, bridging over the rock-supported New Haven Railroad bed and the column-and-beam-supported New York Central track level will actually go through both levels of track. The new columns, resting on footings extending under 24 tracks of the railroad structure, will pierce both platform levels as they thrust up from the subsurface.

Steel men will set the new columns within inches of live rails. The 18½-inch-wide columns, encased in 2 inches of fireproofing concrete, will rise through clearance lines of only 24 inches.

To isolate the new building from the noise and vibrations of the railroads, a new method of installing insulation has been devised. The insulation mats will be inserted under the new steel columns, between the existing and new columns, and between the north wall of the terminal and the south wall of the new building.

Flatcars will haul equipment and supplies; concrete mixing plants will produce right on the site; materials will be lowered from street to subsurface through holes punctured in the railroad structure; and special underground rigging will be installed to lift steel in the early construction stages.

Construction will get under way in the spring on the \$100 million skyscraper, which is scheduled for completion in late 1962.

for

Today's finest crankcase oil for super-charged diesels

...standard of comparison
for over ten years



Today . . . as for 10 years past, Shell Rimula Oil proves more than a match for the greatly increased engine ratings, high temperatures and pressures of modern high-performance diesels. Rimula® Oil successfully tends to resist every destructive force that accelerates engine wear.

Let a Shell Representative show you the benefits of using Shell Rimula Oil. Write to Shell Oil Company, 50 West 50th Street, New York 20, New York, or 100 Bush Street, San Francisco 6, California. In Canada: Shell Oil Company of Canada, Limited, 505 University Avenue, Toronto 2, Ontario.

SHELL RIMULA OIL

—the heavy-duty diesel lubricant



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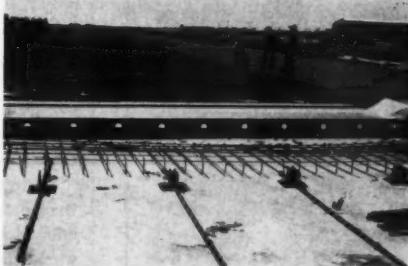


Post-tensioning for taxiway pavement

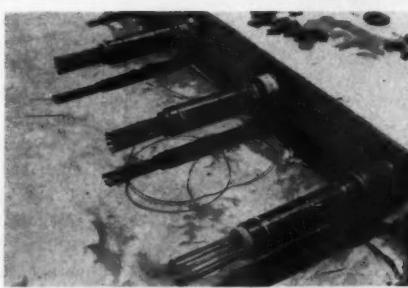
Demonstration area is provided with 9-inch slab;
24-inch nonreinforced pavement is at both ends



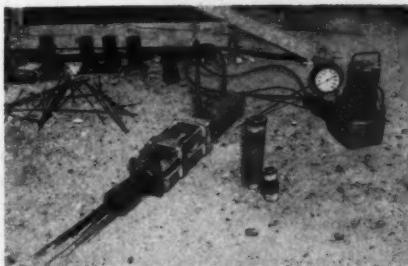
Crews place metal conduits for the transverse post-tensioning strands. A plastic sheet has been placed on the grade. Post-tensioning cables will be brought through the ducts after longitudinal tensioning is done.



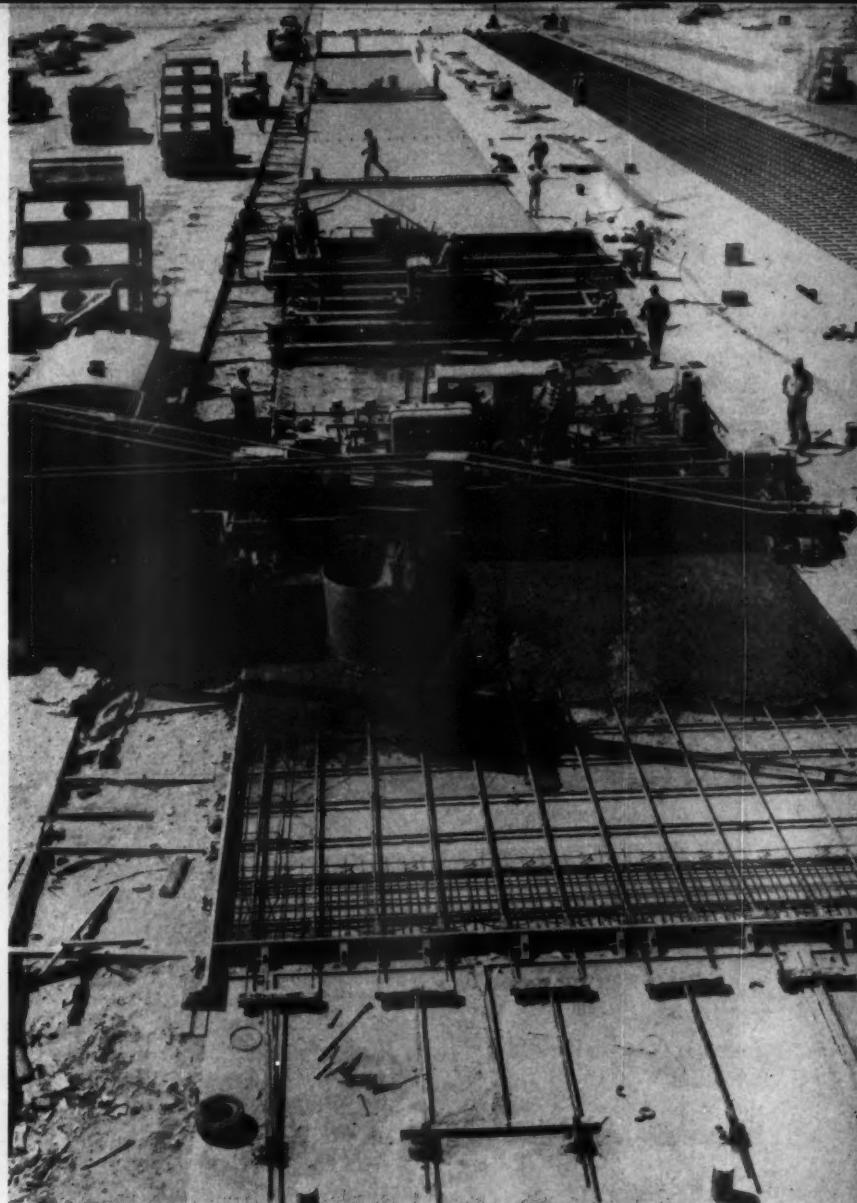
Forms, bulkhead, and ducts for the transverse tendons are in place. Rods and angles provide anchorage at the end of a 500-foot section to hold longitudinal cables during concrete placement.



Post-tensioning is started on wires in three tendons. Elevation of the wires is 34 inches. Sheaths will be pumped full of grout. Transverse wires were stressed after slabs were tensioned longitudinally.



A setup of post-tensioning equipment has a Blackhawk pump supplying hydraulic pressure to the tendons. As wires are stretched, split-ring shims are inserted to maintain the stress on the wires.



Paving of a 500-foot length of prestressed demonstration taxiway at Biggs AFB, El Paso, Texas, nears completion; an adjacent 25-foot strip is finished, and the section at far right is ready for paving. The Koehring 34-E Twinbatch is dumping the mix over metal conduits for the transverse cables and over the longitudinal cables anchored in place, foreground. In the paving lineup are a Jaeger screw spreader with vibrators, a Jaeger finisher, and a Koehring longitudinal float.

The U. S. Army Corps of Engineers previewed the pavement of the future with a demonstration section of prestressed-concrete airfield pavement at Biggs Air Force Base, El Paso, Texas. The post-tensioned slab, only 9 inches thick, takes the place of a 24-inch nonreinforced slab.

The Biggs job and the bids on proposed prestressed pavement at the Navy's new jet base at Lemoore, Calif., indicate that prestressed pavement is not yet ready to compete costwise with the much heavier nonreinforced or conventionally reinforced slabs.

At Biggs AFB, H. B. Zachry Co., San Antonio, had a series of three contracts totaling nearly \$7 million for airfield modifications to accommodate heavy bombers. In order to get comparative data for several types of construction, demonstration areas were constructed on one of the taxiways at a location where the loading would be the same on the several sections.

Both ends of this taxiway were paved with nonreinforced concrete

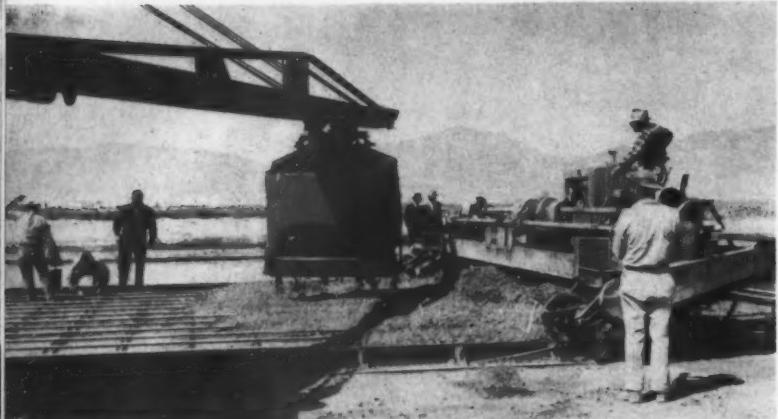
paving 24 inches thick, with joints cut every 25 feet. The test section of prestressed-concrete pavement consists of three 25-foot-wide lanes, 1,550 feet long, with joints spaced at 500 feet. The third demonstration area consists of 1,500 feet of reinforced-concrete pavement 19 inches thick, with joints spaced at 75 feet.

Although the initial cost of the prestressed concrete was considerably higher, it is possible that reduced maintenance and longer life may justify the extra expenditure. Observation of the demonstration sections over a period of years will provide the answer.

Preparing the base

After the section was graded, a 6-inch lift of select subgrade material was placed and compacted to at least 92 per cent density. A second lift of similar material was compacted to a maximum of 97 per cent. This was followed by a 6-inch compacted course of crusher-run base material compacted to at least 100 per cent density. Grade beams 10 inches

(Continued from preceding page)



Thirteen longitudinal prestressing cables are used for a 25-foot-wide lane. They are supported on and tied to the transverse rigid conduits. A Koehring paver is distributing concrete ahead of the Jaeger screw spreader.

thick, 10 feet wide, and 75 feet long were placed transversely across the taxiway and ground to extreme smoothness to support the slabs and help anchor wires during the initial stress. The beams also divide the pavement into 500-foot lengths.

The 9-inch steel forms for the 25-foot-wide lanes were set to line and grade on the base and graded to a 9½-inch depth so that a ½-inch layer of friction sand and a sheet of .006 polyethylene plastic could be laid over the entire area inside the forms.

The next step was the placing of the prestressing cables. This operation, plus the post-tensioning and

grouting, was done under a subcontract by Prestressing Research & Development, Inc., San Antonio. Metal conduits for the transverse cables were placed first. These were 1½-inch lightweight rigid conduits supported on chairs. A plastic ring on the forms kept this conduit in place and at the required level. The rigid tubes had preformed male-female ends so that the transverse conduits in adjacent lanes could be coupled to form a continuous 75-foot conduit through which six 0.25-inch wires were threaded after concrete for all three 25-foot lanes had been placed. The conduits for the transverse cables were spaced 27 inches apart.

The longitudinal prestressing cables were pre-cut and stored on racks beside the forms. These were 500 feet long, and each consisted of 12 wires, 0.25 inches in diameter, encased in a flexible metal sheath. Thirteen cables were placed in the 25-foot width, giving a net spacing of 2 feet.

To place the cables, a gang of some 25 men picked up each cable individually and carried it out into the paving area. These cables rested on the rigid transverse ducts and were tied to them, after they were initially stressed to 10,000 psi, and anchored at the ends.

Placing concrete

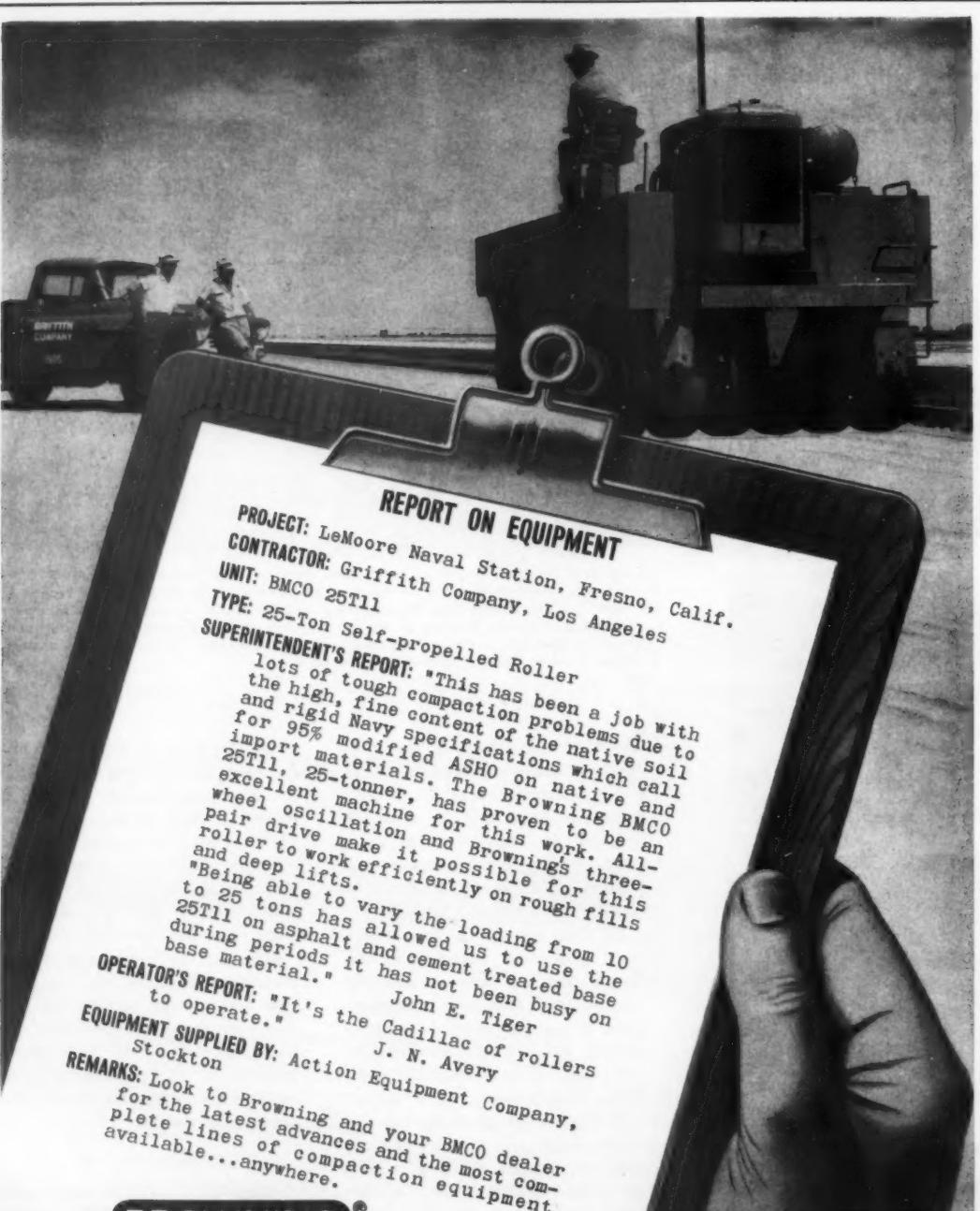
The concrete-placing operation was very similar to that of any non-reinforced pavement. Zachry used two Koehring 34-E Twinbatch pavers in tandem to place concrete in the forms ahead of a Jaeger screw spreader. The spreader pulled a vibrating machine carrying 12 vibrator heads that could be raised or lowered hydraulically.

It was in the vibration that the paving operation was unusual. The vibrators had to be raised every 12 inches when they neared a transverse tube; these were located so that their tops were about 4 inches from the surface of the finished slab. A man signaled the operator by hand when the vibrators approached the point where they were to be raised and again when they were safely past a tube. The vibrators were then lowered in the space between the ducts and operated there while the machine stopped momentarily. This procedure kept the ducts from being damaged.

The spreader was followed by a Jaeger finisher and a Koehring longitudinal float. Behind these was a bridge used by workmen to open the grout holes in the longitudinal cables. These grout openings were spaced at 100-foot intervals along all the main cables. They were later used in the grouting operation to insure the complete penetration of the grout.

As soon as possible after placement, the concrete was covered with cotton mats, which were kept moist for 30 to 36 hours. When mats were removed, the concrete was given an application of white-pigmented curing compound.

Prestressing Research & Development
CONTRACTORS AND ENGINEERS



REPORT ON EQUIPMENT

PROJECT: LeMoore Naval Station, Fresno, Calif.
CONTRACTOR: Griffith Company, Los Angeles
UNIT: BMCO 25T11
TYPE: 25-Ton Self-propelled Roller

SUPERINTENDENT'S REPORT: "This has been a job with lots of tough compaction problems due to the high, fine content of the native soil and rigid Navy specifications which call for 95% modified ASHO on native and import materials. The Browning BMCO 25T11, 25-tonner, has proven to be an excellent machine for this work. All-wheel oscillation and Browning's three-pair drive make it possible for this roller to work efficiently on rough fills and deep lifts. Being able to vary the loading from 10 to 25 tons has allowed us to use the 25T11 on asphalt and cement treated base during periods it has not been busy on base material." John E. Tiger

OPERATOR'S REPORT: "It's the Cadillac of rollers to operate." J. N. Avery

EQUIPMENT SUPPLIED BY: Action Equipment Company, Stockton
REMARKS: Look to Browning and your BMCO dealer for the latest advances and the most complete lines of compaction equipment available...anywhere.

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P.O. BOX 2707 - SAN ANTONIO, TEXAS - WALnut 3-4331

Export Office: P. O. Box 1051, Denver, Colorado

For more facts, use Request Card at page 18 and circle No. 269

Inc., uses a post-tensioning system with solid and split-ring connectors that engage upset button heads on the ends of the rods. Blackhawk hydraulic jacks powered by electrically driven pumps supplied the pressure as the tendons were tensioned from both ends simultaneously. Telephone communications between the jacking crews at the ends of the sections enabled workmen to apply the stress uniformly from both ends.

When job-cured cylinders showed compressive strength of 870 psi (usually the day after placement), the longitudinal tendons were stressed to 35,100 psi. When the job-cured cylinders reached a compressive strength of 1,740 psi, the tendons were stressed to 70,200 psi. When job-

cured cylinders reached 4,050-psi compressive strength, tendons were stressed to 192,000 psi for two minutes and then anchored at 168,000 psi. Total elongation was about 17 inches at each end. Anchorage was accomplished by inserting split-ring shims of various lengths.

The sheaths were then pumped full of grout. Pumping started from the ends and continued as long as the grout continued to flow and showed up at the check holes every 100 feet. When necessary, the grout was pumped in at these holes to insure complete filling of the sheath.

When the three adjacent 25-foot slabs had been placed and tensioned, the transverse tendons were threaded through the ducts. These were tensioned and grouted in the same type of operation as was used for the longitudinal steel.

Reinforced-concrete filler slabs were then cast over the grade beams between the 500-foot prestressed sections and at the ends of the area. Expansion joints, 1½ inches wide, were placed at each end of the area.

Personnel

The project was supervised for H. B. Zachry Co. by project manager J. W. Lowe, Jr. The prestressing operation was done under the supervision of H. H. "Hank" Hendrix of Prestressing Research & Development, Inc.

The Albuquerque District of the Corps of Engineers was represented on the project by resident engineer F. O. Reeves and project engineer R. J. Hernes. The district engineer is Col. A. L. Reed.

THE END

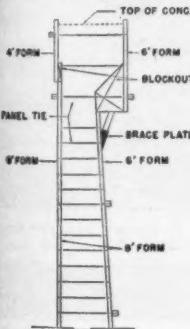
Battered Walls



Symons Forms on St. Louis Expressway

... Form Double Battered Walls 12" at Top, 3' at Base

On the downtown phase of the St. Louis Mark Twain Expressway, contractor R. B. Potashnick & J. S. Alberici Construction Company used 8,000 cu. ft. of Wood-Ply and 20,000 sq. ft. of Symons Steel-Ply Forms.



Job called for retaining walls, many of them double battered so that forms were angled to give 12" top thickness and up to 3' thickness at base. Heights varied from 4' to 34'. In addition, the forms were used to pour footings, abutments, piers and beams. Contractor obtained 30 re-uses.

Symons Forms may be rented with purchase option. Additional information on how to use Symons Forms for battered walls sent on request.

Symons
SYMONS CLAMP & MFG. CO.
221 University Ave., Dept. L-9, Chicago 39, Ill.
MORE SAVINGS FROM SYMONS

For more facts, circle No. 270

NOVEMBER, 1959



Twelve quarter-inch longitudinal prestressing cables, each in a flexible metal sheath, have upset button heads at both ends. The anchorage castings and the solid-ring anchor are attached to the ends of the cables.

Hard-to-reach places are easy for



Gasoline-powered Model VG shown—drives and heads interchangeable with electric-powered Model VE.



THE PERFECT SOLUTION for concrete compaction in restricted areas is a Viberette Vibrator with small diameter flexible drive and head with replaceable rubber or steel tip.

The 12,000 rpm speed and low amplitude of Viberette produces extremely effective vibration in consolidating low slump concrete—in narrow construction forms, narrow stems of prestress T-sections and other hard-to-reach places.

Easy portability and one-man operation keep labor costs to a minimum.

WRITE TODAY for full information!



VIBRATORS

Pioneers and leaders in the manufacture of vibrators.

For more facts, use Request Card at page 18 and circle No. 271

Tricks of the Trade



Horizontal drains installed to help in stabilizing slides along new highway

Horizontal drains, driven in an average of 200 feet from the face of the roadway cut, aided in stabilizing a large slide area that developed during the grading of a new highway alignment on U. S. 95 near Culdesac, Idaho.

Contractor S. S. Mullen, Inc., Seattle, Wash., was moving dirt with a scraper spread near the lower end of Lapwai Creek Canyon when a 600-foot-long section of hillside began to slide. As the huge mass of earth slowly oozed downhill, it moved right under a railroad track, causing some displacement, and boiled up at the foot of the slope beyond.

Work in the area was stopped immediately while steps were taken to halt and stabilize the slide. A study showed that the mass of earth was being kept moist and plastic by water seeping from springs along the uphill side where the soil met the solid rock of the mountainside. The horizontal drains were installed to pick up this water and carry it away before it could soak up the soil.

Twelve of the 1½-inch drains were driven nearly horizontally through the mass of soil until they encountered rock. These drains were all connected to an 8-inch Helicor pipe header leading to a culvert that carried the water away from the slide area. A considerable flow of water was observed when the pipes were first installed, and this gradually decreased as the moisture was drawn out of the area. No further movement of the slide was observed after the installation of the pipe had been completed.

In addition to installing the drains, the contractor placed 50,000 cubic yards of earth counterweight on the toe of the slide to provide extra stability. The Department of Highways redesigned the grade to reduce the load on the slide area, and the contractor moved back several months later to complete the grading. Some of the drains are being left in place to keep the area drained.

In the illustration at the top of the page Mullen's project engineer, Ray Senior, is examining the junction of two of the horizontal drains with the 8-inch Hel-Cor header. Other drains can be seen in the background.

Streams provide grading job with gravity water supply



Look, men, no pumps! A plenty supply of clear, pure water flows continuously by gravity into the contractor's elevated tanks, from which the water wagons load by gravity.

Wood-Kirst Co., general contractors for a 6-mile \$5 million interstate grading project on U. S. 40 highway in the Sierra Nevada mountains of California, took advantage of two small mountain streams within the project limits as a source of water.



NEW CAT DW20 4-wheel, 345 HP Series 6T with 24 cu. yd. No. 482



NEW CAT DW21 2-wheel, 345 HP Series 6T with 19.5 cu. yd. No. 470



NEW CAT No. 619 2-wheel, 225 HP Series 6T with 14 cu. yd. No. 442

supply for the job. The streams not only supplied the water but also provided the necessary head to raise it to the elevated tanks.

The W-K crews built small diversion dams at points high enough upstream to provide gravity flow to the desired tank location. They laid strings of Wade 6-inch aluminum pipe down along the streams and up into the two 5,000-gallon tanks set on timber stands at convenient points along the job.

Each tank was fitted with a 6-inch discharge line and quick-opening valve for filling tank trucks. No star valves, regulating devices, or

pumps were required. Water flowed by gravity into the tanks until they were full, at which point the flow automatically stopped. As soon as water was drawn from the tank, the flow started again.

The contractor used five 2,700-gallon tanks on International G.I. trucks to deliver and place the water throughout the job. The picture shows a truck loading.

Wood-Kirst Co. is a joint venture of Clyde W. Wood & Sons, Inc., North Hollywood, and Kirst Construction Co., Altadena, Calif. The project is being built for the California Division of Highways.

Two-way radio mounted on transverse finisher saves time and effort

A 2-way radio, mounted on the transverse finisher, helps coordinate the paving operation of F. F. Mengel Co., Custer, Wis.

In addition to having Motorola units installed at the batch plant and in the superintendent's car, the company finds it convenient to have a radio on the Blaw-Knox finisher. The direct communication between the plant and the paving spread saves a lot of time and confusion.



If the plant needs to warn the spread that batching is going to have to shut down for half an hour, it can reach the spread directly by radio. There is no need to relay the message by radio to the superintendent and ask him to inform the spread.

The picture was taken on Mengel's job of paving eleven miles of Wisconsin Interstate 94 on the route between Chicago and Milwaukee. In an unusual highway paving operation, crews placed 12-foot lanes using transit-mix trucks.

BIG NEW CAT WHEEL RIGS CUT PRODUCTION COSTS

name the job...these new Cat Wheel Tractors and matching LOWBOWL Scrapers can do it better with faster cycles and faster production, at lower cost. For example:

DW21 Series G Tractors and matching LOWBOWL

Now these big wheel tractors develop 345 HP increase of 8% over former units. Both tractors 12% more rimpull than before—the DW20 develops 39,565 lb. (maximum) rimpull, and the DW21 39,100 lb. (maximum) rimpull. As a result, they travel faster (up to 20%) under similar haul conditions. To accommodate this greater power capacity, improvements have also been made in transmission and final drive.

Matching the increased horsepower and productivity are the new No. 456 and 470 Series G Wheel Tractors. Rating is increased 8% to 19.5 cu. yd. struck and 27 cu. yd. heaped. (The No. 482 is 24 cu. yd. struck and 34 cu. yd. heaped.) Bowl, draft frame and apron are designed for greater resistance to tough materials and loading— withstand higher loading stresses.

No. 442 Series B Wheel Tractor and No. 442 Series B

LOWBOWL Scraper Here is the latest addition to the Caterpillar line of high-speed earthmoving equipment. This new earthmover is a 14 cu. yd. struck (18 cu. yd. heaped) unit featuring ground-hugging roadways, "years ahead" service-accessibility, and high productivity. The No. 619 has a turbocharged 225 HP

engine (and high torque rise), planetary final drives, unit construction, tubeless tires, a swing-away dash, 2-jack steering, and a dry-type air cleaner, providing the design and performance features that insure superior workability on a broad range of applications. All this in the new No. 619-No. 442 unit—plus proved economy over any earthmover of comparable size.

DW15 Series F Wheel Tractor and No. 428 LOWBOWL

Scrapers Greater strength and productivity in the well-known four-wheel DW15-No. 428. Bevel gear and pinion, differential and front wheel spindles offer increased service life. Machine delivers 200 HP. The big LOWBOWL Scraper handles 13 cu. yd. struck, 18 cu. yd. heaped. Can be unhitched to haul other units.

Plan your work around these new Cat Wheel Rigs for top production at lowest cost: The DW20-DW21 Series G, the new No. 619 and the DW15 Series F. The complete facts are at your Caterpillar Dealer. Call him today for a demonstration.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

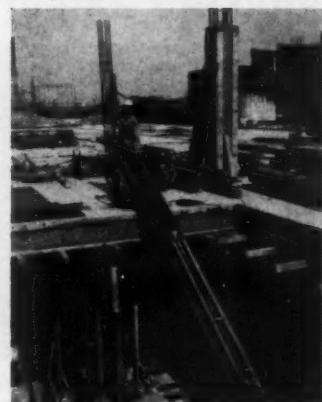
Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

BORN OF RESEARCH
PROVED IN THE FIELD

Belt conveyor speeds form handling on building projects

One of the biggest time savers for the Baker Forms Co. is a 28-foot belt conveyor. The Indianapolis contracting firm built the conveyor to speed the moving of shores, forms, and building materials from one floor to another during the construction of reinforced-concrete buildings.

The method replaces the slow and back-breaking task of handling the forms and shores from one floor to



the next. The conveyor is normally placed in an elevator shaft or stairwell in the building. One or two men feed the belt at the bottom, and a man at the top picks off the material and stacks it to one side. The conveyor can handle anything from 4x8 sheets of plywood to 24-foot-long 4x6's.

The shop-built conveyor is made of a 1-foot-wide endless belt mounted on a 28-foot-long rigid frame. The load-carrying half of the rubber belt rides on three 1-inch steel bands running the length of the frame. The center band is depressed to give a dished surface. The belt is powered by a 3-hp 110-volt electric motor that drives a Dorris speed reducer. This transmission automatically changes gears to accommodate the load.

←For more facts, circle No. 272



Monolithic tee girders and deck, the post-tensioning of each 154-foot span as a unit, and forming on natural ground with excavation done later underneath the spans made construction unique for Chicago's Montrose Avenue bridge over the Edens and Northwest expressways.



The three spans are in various stages of construction. In the background, an end span has been completed. At center is the partially formed middle span; tensioning cables have been strung out and, in some cases, are in position in the form. In the foreground, a D8 tractor-dozer fine-grades for the 4-inch-thick concrete work slabs on which girders are formed.



As forming is set, one of the side forms for each girder is left out so that men can conveniently place the reinforcing steel and tensioning cables.



The 2½-inch flexible tubes, each carrying forty ¼-inch AS&W stress-relieved wires, are positioned at both ends by a templatelike plywood bulkhead.



Two Lorain cranes place concrete for the girders and deck, swinging buckets from the Smith transit mixers.



Final tension is applied and elongation measured. The 200-ton hydraulic jack stressed girders one at a time.



After draglines dig out the clay alongside the bridge, a D8 tractor-dozer goes in under the span to excavate. The Edens and Northwest expressways and tracks of the Chicago Transit Authority were depressed under the three spans.



Spans 154 feet long are formed on natural ground; after concrete is placed for girders and deck . . .

Bridge span is post-tensioned

They'll be talking about the Montrose Avenue bridge for a long time. It is an unusual bridge, and it was built in an unusual way.

The three spans are exceptionally long for a concrete bridge: each is 154 feet. It is a post-tensioned bridge, but not of the ordinary type. The tee girders were poured in place along with the deck, and then the entire

span was post-tensioned as a unit.

The contractor, Thomas McQueen Co., Chicago, didn't spend a cent on falsework to support the long span. He took advantage of the natural ground and rested the girder bottoms on strips of concrete. After a span was tensioned, the clay was excavated from beneath the bridge.

The 462-foot bridge carries the four

lanes of Montrose Avenue over the junction of Edens and Northwest expressways on the north side of Chicago. The expressway junction, which is depressed at this point, carries six lanes of traffic under one end span and six lanes of traffic under the other end span. Trains of the Chicago Transit Authority pass under the middle span. The trains use the wide median strip for their two sets of tracks.

Built under the supervision of the Cook County Highway Department, and designed by Preload Co., Inc., of New York City, the \$1.1 million structure sets a record in the Midwest for length of a post-tensioned span. It is the fourth multispan, cast-in-place bridge in the U. S. to be built this way. Its 154-foot spans are the longest of any in these structures, and the 7-foot-deep girders are significant for a bridge of this size: the depth-span ratio is 1:22. The longest span of the other bridges using this design is 120 feet.

The bridge, crossing the expressway on a 50-degree skew, is carried by two 9-column reinforced-concrete piers and two abutments. The piers and abutments rest on spread footings. The 81-foot width of the deck, which consists of two 30-foot roadways, two 8.5-foot walks, and one 4-foot median, is carried by ten girders. The 6-foot-7-inch-deep girders flare out from 10 inches wide at their tops to 18 inches wide at their bases. This made it possible to economize on the amount of prestressing force and steel required. Clearance limited the depth of the girders to 7 feet. If a rectangular girder had been used, a greater prestressing force would have been required, and this would have meant using more tendons. This would have made it difficult to place the tendons in the webs and would have required an additional girder in each span.

Dig out for piers

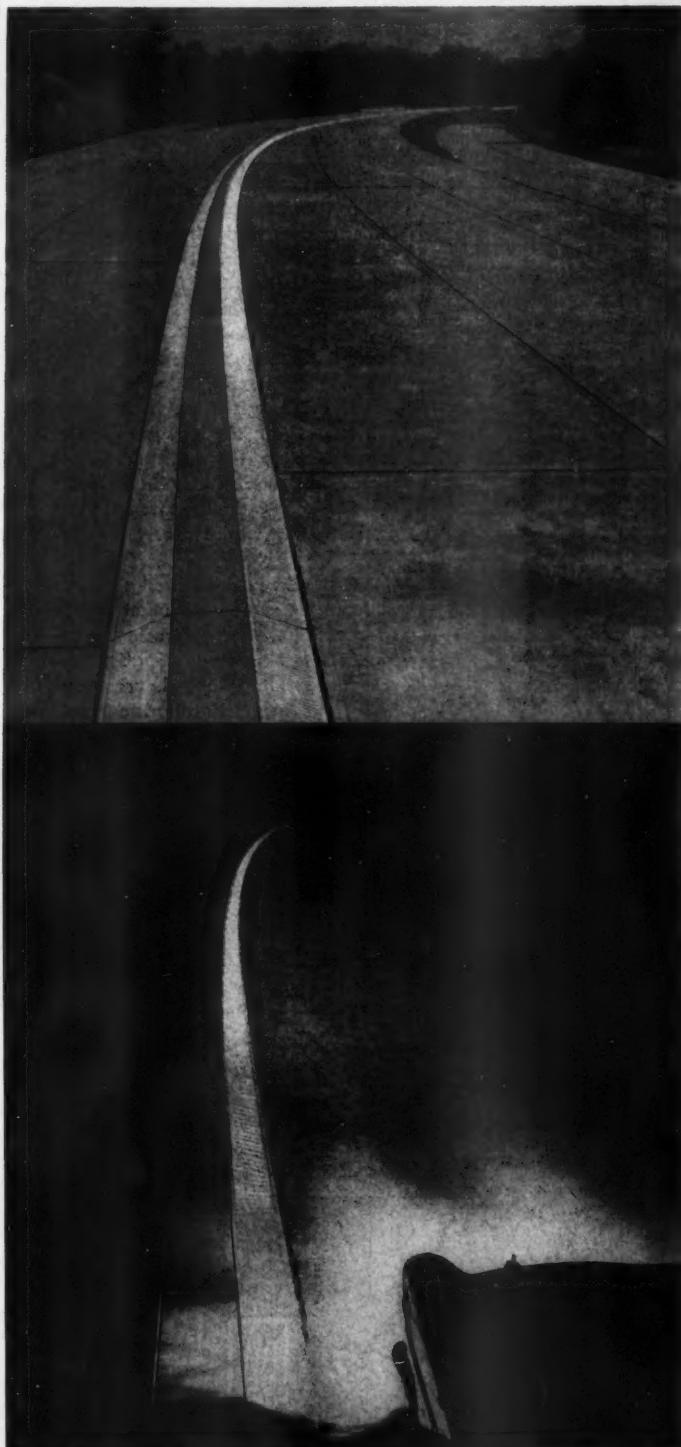
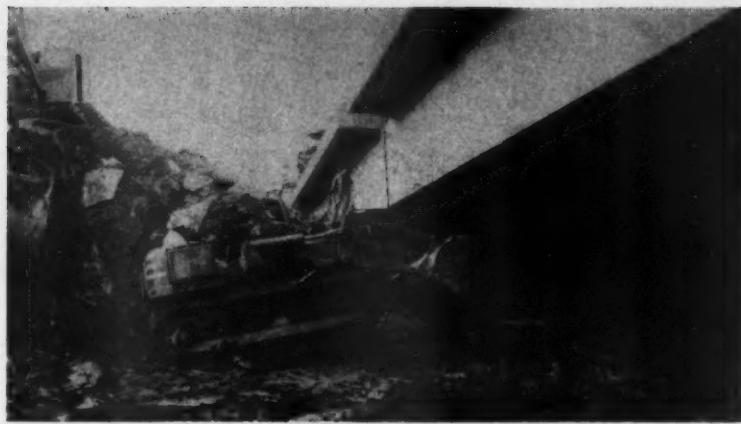
Since the expressway had not been cut through, the contractor decided to take advantage of the natural ground to support forms for the spans. Ground between the piers was cut down to the elevation of the bottom of the girders. Before piers and abutments could be built, trenches had to be excavated to a depth of about 25 feet down to the level of the spread footings. The trenches were wide enough to permit men to form the piers and place concrete in the usual way. Twenty individual 5-foot-diameter and 15-foot-deep concrete piers were installed. After piers and abutments were completed, they were backfilled with sand.

Concrete "sidewalks" for girders

After the ground was graded out several inches below the level of the girder bottoms, 4-inch-thick "sidewalks" of concrete were placed along the lines of the individual girders. Each 3.5-foot-wide sidewalk supported the forming for one girder. The plywood girder bottoms were nailed to transverse 2 x 6's resting fletwise on the concrete. Particular

(Continued on next page)

An Allis-Chalmers HD-6 front-end loader excavates clay from under a completed span after draglines had dug down alongside the bridge. Wood forms were wrecked from underneath the spans by hand.



CS-87 "USS" and "Atlas" are registered trademarks



Atlas White Cement marks the curve day or night

Reflecting concrete curbing made with Atlas White portland cement marks the road's course—every straightaway, curve and turn—well ahead of the driver. By day, the white surface stands out in contrast to darker road paving. By night, saw-toothed corrugations reflect the car's headlight beams back to the driver for greater visibility. And rainy weather actually heightens the effect; wet curb surfaces become even more reflective.

For more information on the use of Atlas White portland cements in highway and street construction, write Universal Atlas, 100 Park Ave., New York 17, N.Y.

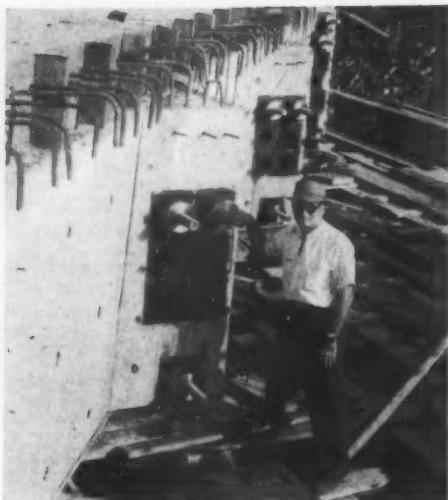
OFFICES: Albany • Birmingham • Boston • Chicago
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Universal Atlas Cement
Division of
United States Steel

For more facts, use Request Card at page 18 and circle No. 273

(Continued from preceding page)



Phil Joy, in charge of construction for the contractor, stands beside the end of one of the 6-foot-7-inch girders. Three of the seven cables have been stressed to 25 per cent of final tension to help reduce temperature and shrinkage cracks. Each nut-and-bolt arrangement, which holds tension on 40 tendons, is removed after tensioning.

care had to be taken in setting the girder bottoms, for they received a 1-inch reverse camber or "dish." The built-in sag was later taken out of the girders by the post-tensioning operation. Final camber on the girders was about $\frac{1}{8}$ inch above the horizontal at their midpoint. The deck formwork was supported on diagonal timber knees resting on the soffits. Four sets of forms were used for the six half-width spans; construction of each set took an average of two weeks.

When girders were being formed, one of the sides was left open for convenience in placing the reinforcing steel and draping the $2\frac{1}{2}$ -inch flexible tubing. Each of the seven flexible

tubes in a girder was positioned at both ends by a template-like plywood bulkhead. The sag was accurately controlled for the length of the girder by steel chairs. Before each tube was set in place, it was threaded with forty $\frac{1}{4}$ -inch American Steel & Wire stress-relieved wires. Post-tensioning assemblies were manufactured by Joseph T. Ryerson & Sons.

Since the bridge contains an expansion joint running down the center, it was convenient to pour half the width of a 154-foot span at a time. Normally, two Loran transit mixers bucketed the concrete from small transit mixers to the forms. As the deep girders were filled in 25-foot lifts, the mix was thoroughly vibrated. In fact, during the 455-yard pour, as many as seven electric-powered vibrators were busy consolidating the top lift, as well as penetrating to the lift below.

Plastiment retarding densifier was added to the mix to retard the set of the 5,000-pound concrete, permitting the half-width of the span to be concreted in one working day. A crew of 14 handled the job in a 10-hour shift. The use of the retarding densifier also made it possible to reduce the amount of water required in the mix, while maintaining good workability. Other advantages were rapid clear water bleeding after placement and the obtaining of a dense concrete that prevented honeycombing and voids.

The Plastiment was added in the proportion of five ounces per bag of cement at a temperature of 65 degrees F., 6 ounces under 85 degrees F., and 7 ounces over 85 degrees F. for webs and diaphragms. The regular 2, 3, and 4-ounce proportions were used for the bridge deck for the same temperatures. The gravel aggregate used had a maximum size of 1 inch, and the mix contained seven sacks of cement per cubic yard.

After the surface of the concrete was leveled with a vibrating screed, it was given a float finish. The concrete was then cured under wet burlap.

Post-tensioning

Three days after concrete was placed, three of the seven tensioning assemblies in each girder were pulled to 25 per cent of their final tension. This slight tension tended to hold the concrete together and prevent temperature and shrinkage cracks. At this time, the concrete had attained a strength of 2,500 to 3,000 psi. Strengths of 4,500 psi were obtained in 12 days, and strengths of well over 5,000 psi were realized in 28 days. The addition of Plastiment in the mix sped the strength gain. This, in turn, made forms available for the second and third spans sooner than usual.

The final tension was applied when the concrete had reached a compressive strength of 4,500 psi. Since the half-width of a span had to be post-tensioned as a unit, a scheduled sequence of pulling the individual assemblies had to be followed. Rather than completely tensioning one girder

(Continued on page 31)

IF LIMITED SPACE IS YOUR PROBLEM Specify CLOSE COUPLED

for high angularity within cramped space but compensates for out-of-alignment conditions. The shocks and strains that crawler tractors encounter in heavy duty work often are so great that they temporarily twist the tractor frame. MECHANICS Close-Coupled Type UNIVERSAL JOINTS are designed to provide the F-L-E-X-I-B-I-L-I-T-Y needed to make efficient operation possible under such adverse conditions. MECHANICS exclusive KEY method of driving has the highest safety factor, transmits the most torque, and avoids costly breakdowns that result from driving through bolts or screws that work loose.

MECHANICS key-drive strength, flexibility and balance are unanimously specified by the largest tractor manufacturers to keep huge capacity machines operating long hours, day-after-day. They can't afford to permit large tractors and equipment to be kept idle by needless down-time. Let MECHANICS engineers help build reliability into your [200 to 50,000 foot pounds torque capacity] machines.

MECHANICS UNIVERSAL JOINT DIVISION Borg-Warner

2030 Harrison Ave., Rockford, Ill.

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Unique features of MECHANICS Roller Bearing UNIVERSAL JOINTS make them unusually easy to install and service. The complete cross and bearing assembly can be removed simply by taking out the cap screws and separating the end yokes slightly. No flange is required for drive shaft connections. Accurately and durably built for long, heavy service, MECHANICS Roller Bearing UNIVERSAL JOINTS are inherently balanced for smooth operation.

Modern Crawler tractor design requires a F-L-E-X-I-B-L-E connection between the engine and transmission. MECHANICS Close-Coupled Type UNIVERSAL JOINTS not only provide

MECHANICS Roller Bearing UNIVERSAL JOINTS

For Cars • Trucks • Tractors • Farm Implements • Road Machinery •
Aircraft • Tanks • Busses and Industrial Equipment

For more facts, use Request Card at page 18 and circle No. 274



Grading a road in Florida



Maintaining a haul road in Illinois

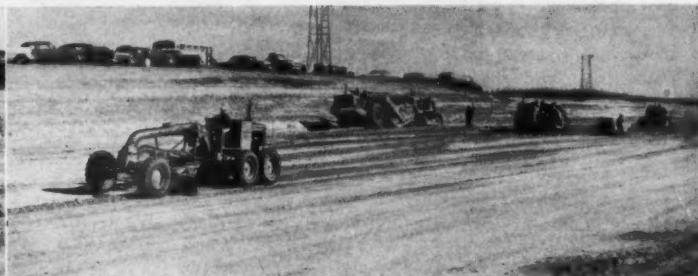


Rough grading a turnpike in Texas

Top GRADE MEN all over the country



Leveling a haul road in Indiana



Finishing a cut in Nebraska

choose Allis-Chalmers



Maintaining haul roads in Minnesota



Spreading fill in Alabama



Trimming up a haul road in Mississippi

FORTY FIVE motor graders



Maintaining logging road in Washington



Removing rough spots on a haul road in Colorado



Fine-grading base material in Oregon

When selecting motor graders for your next job, consider this swing to the FORTY FIVE . . . then check this combination of features available only in Allis-Chalmers motor graders:

- ROLL-AWAY moldboard, an Allis-Chalmers exclusive, reduces friction by moving the load up and ahead of the board . . . handles more material per horsepower than any other make.
- High-arch front axle clears big windrows . . . reduces axle dozing that hampers steering and cuts production.
- Extra high throat clearance accommodates big rolling loads without jamming material against the circle.
- Toggle-type controls, another Allis-Chalmers exclusive, give operators positive control . . . eliminate wrist-snapping backlash.

Your Allis-Chalmers dealer will arrange for you to try these and the many other features that make the Allis-Chalmers FORTY FIVE your best BIG grader buy. Tell him to set the date. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.



FORTY FIVE motor grader
127 horsepower
6 speeds forward to 20.6 mph
3 speeds reverse to 7.0 mph
23,800 lb (approx)

ROLL-AWAY is an Allis-Chalmers trademark.

Move ahead with **ALLIS-CHALMERS**
... power for a growing world

For more facts, use Request Card at page 18 and circle No. 275



On the job for the contractor, Thomas McQueen Co., are Brooks Faulk, left, foreman, and Phil Joy, in charge of construction.



(Continued from page 34)

at a time, the jacking operation skipped in a predetermined order from girder to girder. Working from one end, a 200-ton hydraulic jack stressed the girders one at a time. The total preload applied by the seven units varied in the individual girders from 1,100 to 1,300 tons.

Excavation

With the deck completed, it was no great job to tunnel under the bridge. Draglines dug down on each side of the bridge; then two Cat D8 angledozer and an Allis-Chalmers HD-6 front-end loader cut out the

clay from under the deck. The wood forms were wrecked out by hand.

Design

The simple span construction for the bridge was decided on by the consultants after considering continuity of the 3-span structure over its entire length. It offered these advantages:

1. Re-use of falsework and formwork with simple span construction was realized here, but it would not have been possible to any great degree with continuous spans.
2. Simple spans require little more material than continuous spans.

3. Stressing details were straightforward with simple spans; with continuous spans they seemed unduly complex.

4. The expeditious construction possible with simple spans far outweighed the small material savings (such as bridge shoes and expansion joints) that could have been realized by using a continuous design for the bridge.

The cost of the superstructure amounted to \$517,800, which works out to \$13.83 per square foot, making this design competitive with others using different materials.

Personnel

For the owner, the Cook County Highway Department, the project was initiated with the approval of William J. Mortimer, superintendent, and Hugo J. Stark, chief engineer. Milton Page was the bridge engineer. Construction was supervised by Royal O. Mortensen, the department's engineer of bridge construction, with Ed Morrissey as resident engineer. The bridge was designed by M. Schupack, then vice president and chief engineer of the Preload Co., and now partner in Schupack & Zollmon, consulting engineering firm. The latter firm supervised construction under the direction of M. Schupack, with Eugene Marlowe as resident advising engineer. Thomas McQueen, the general contractor, had Phil Joy in charge of construction. THE END

Freezing and thawing tests on concrete

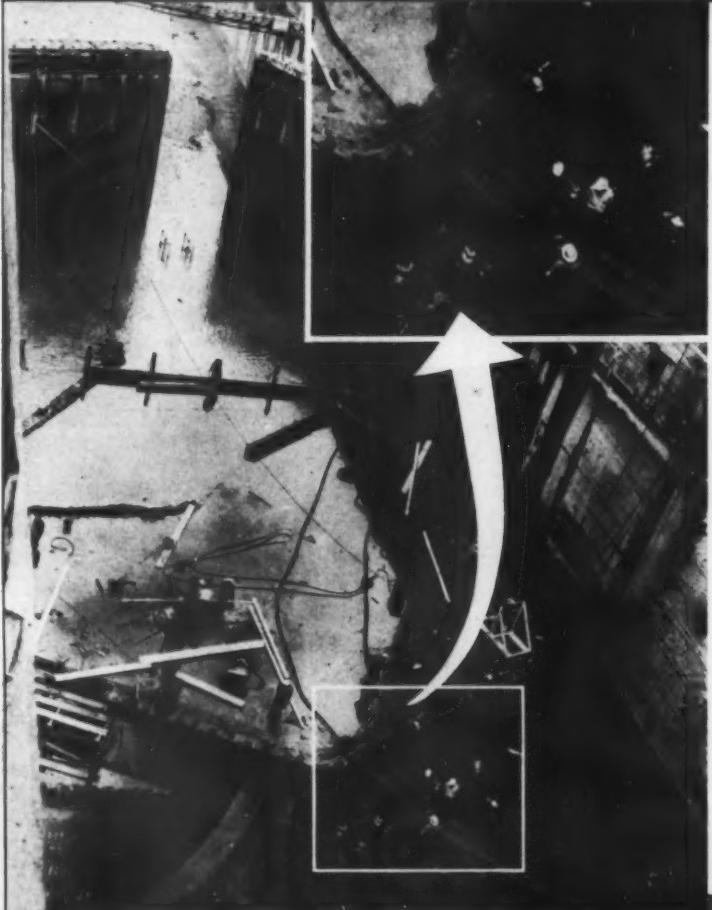
■ "Report on Cooperative Freezing-and-Thawing Tests of Concrete," Special Report 47, is available from the Highway Research Board, 210 Constitution Ave., Washington 25, D. C.

The \$1.50 report gives a review of previous programs and an outline of the 1959 program. It discusses performance of apparatus; materials; concretes; comparisons between mean durability factors; number of specimens required for test; variability of freezing-and-thawing results; and air-void parameters of hardened concretes. Six appendixes cover: the significance of differences between means, confidence-limit curves, and probability levels; the statistical determination of significant difference between means; the Laboratory No. 1 side program; materials, coarse and fine aggregate; tables of complete data; and suggested operating procedures.

Mid-Valley changes name

■ Mid-Valley Utility Construction Inc., Houston, Texas, has changed its name to Mid-Valley, Inc., to correct the impression that the firm engages exclusively in public-utility work. Mid-Valley provides engineering design and construction services to a wide range of industry.

FLYGT PUMPS SPEED SEAWAY EMERGENCY JOB



Just five days before President Eisenhower and Queen Elizabeth were due to dedicate the greatest engineering achievement of the decade, a broken timber sill blocked Lock No. 4 in the Welland Canal, vital link in the St. Lawrence Seaway. Sixty-seven vessels were waiting to get through. Lock No. 4 had to be pumped out at once so that repairs could be made. Nine FLYGT pumps were rushed to the site. Only one hour after they were placed in the lock their work was done.

FLYGT pumps require no elaborate installation — they are simply lowered into the water and switched on. These electrically powered, fully submersible pumps can run for weeks without supervision. They will handle a high proportion of solids without clogging, are not damaged by salt water and do not overheat if run dry.

FLYGT pumps are available with capacities up to 3000 GPM and for heads up to 220 ft.

Write, wire or phone for full information and name of your nearest distributor. On-the-job demonstrations arranged quickly.

FLYGT
WEST OF THE MISSISSIPPI: EAST OF THE MISSISSIPPI:

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MFG. & SALES INC.

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STENBERG
MFG. CORPORATION

Hoosick Falls, N.Y.

PUMP BETTER ELECTRICALLY - USE FLYGT

For more facts, use Request Card at page 18 and circle No. 276

CONTRACTORS AND ENGINEERS

A Lorain handles one end of a pre-stressed roof girder being set atop the wall of a Physical Education Building extension at the University of Oregon. The 112-foot-long girder weighs only 80,000 pounds.

Lightweight aggregate used for long girders

An addition to the men's Physical Education Building at the University of Oregon at Eugene required five pre-stressed-concrete roof girders spanning 112 feet. The cast-in-place method was ruled out because of the great height. Precasting on the site was considered inadvisable. It looked like a plant prestressing and precasting job.

But the weight of one of the girders out of concrete made from stone or gravel aggregates would have been too great for hauling over the highways. The solution: plant precasting and prestressing using lightweight concrete.

Empire Building Material Co., Portland, took the subcontract to produce and deliver the five big girders. Using Lite-Rock expanded shale aggregate, Empire got the weight of the big girders down to 80,000 pounds each. The lightweight aggregate is made by an Empire subsidiary, Northwest Aggregates, Inc., Banks, Ore.

I-shaped girders have a section 6 feet high with 2-foot-wide flanges; reinforcing consists of ten U-wire post-tensioning cables of 1/2-inch wires. The cables, encased in flexible metal sheaths, were draped in the forms to concentrate the steel in the lower flange at the center of the spans while distributing it through the webs at the ends. The prestressing force of some 3/4 million pounds per girder was applied by the Freyssinet system.

The job of transporting the big girders from Portland to Eugene was shared by two firms, Oregon Transfer Co. and Willamette Hauling Co., both of Portland. Both outfits have heavy-duty rigs with steerable trailers for this type of haul. The gross weight of truck, trailer, and one girder was over 100,000 pounds.

On the job site, two cranes picked the girders off the trucks and raised them into place on columns cast in place in advance.

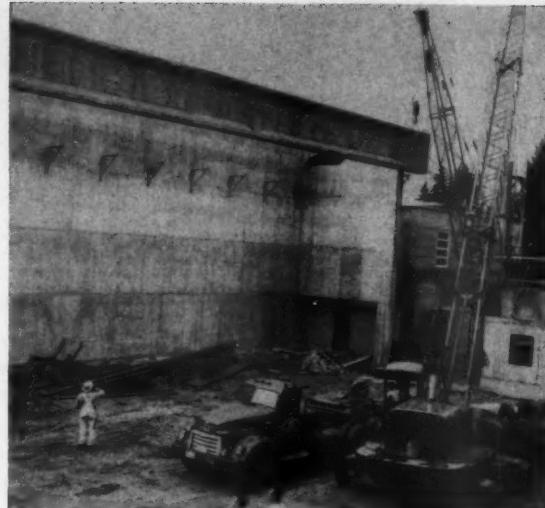
Loewy-Hydropress news

Two sales-department appointments have been made by the Loewy-Hydropress Division, Baldwin-Lima-Hamilton Corp., New York City. William R. Liebel is now assistant product sales manager of rolling mills, and Felix Klein is assistant product manager of hydraulic machinery.

Napco appoints two

D. Edward Manning has been appointed director of sales and marketing for Napco Industries, Inc., Minneapolis. At the same time, Willard C. Wilson was named field sales manager.

NOVEMBER, 1959



Daybrook names managers

The Daybrook Hydraulic Division, Young Spring & Wire Corp., Bowling Green, Ohio, has appointed John G. Notheis as north central zone manager for the company. He will work with Daybrook truck-equipment distributors, assisting in the merchandising and servicing of dump bodies and hoists, Power Gates, Power Loaders, and Power Packer truck equipment. Notheis' territory includes Illinois, Wisconsin, and Michigan.

H. J. Lewinski has been appointed manager of distributor development, in charge of the appointment of new distributors, sales training, and distributor-relations programs for the company. These activities will be on a national basis.

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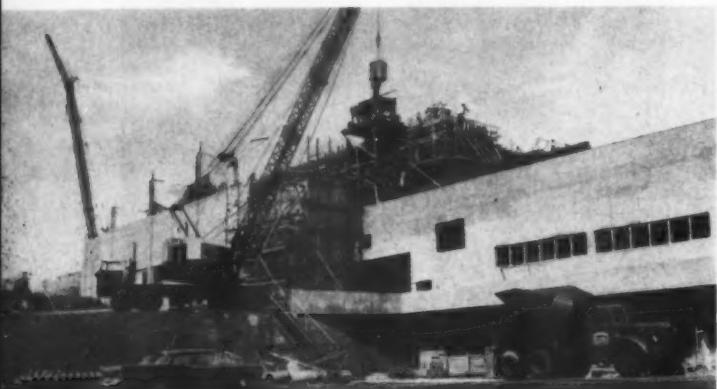


Precasting and prestressing play major roles in construction of a . . .

NEW HOME for the GIANTS



The lower deck of the stadium is of reinforced concrete, and construction is relatively simple. Workmen are building forms for the seat stringers. Rock was excavated to the slope of the lower deck; stringers were cast right on the ground.



The job's big problems arose as work reached the upper level of the stadium. A Lima crane with a Gar-Bro bucket is hoisting concrete to a Gar-Bro hopper on the upper deck. A Cal-Rex mixer, on a Mack truck, supplies the concrete.



An Insley lifts seat supports to the upper deck. The subcontractor prestressed 1,000 seat supports for the upper deck; 2,045 were simply precast for the lower deck.



Precasting, prestressing, and post-tensioning methods are used in construction of the 40,000-seat home of the Giants at Candlestick Point, facing San Francisco Bay. At this stage, the precast lower-deck seat supports have been set at the far side.

by RALPH MONSON, field editor

Precast and prestressed-concrete elements were vital factors in the speedy construction of the beautiful new multimillion-dollar, 40,000-seat stadium that is the new home of the Giants. Some 3,045 seat supports and 180 double-teel roof sections were precast off the job site. In addition, 41 big 12-ton reinforced-concrete A-frames, 44 equally heavy boomerang-shaped roof supports, and 42 semi-cylindrical wind-baffle panels were precast right on the job site.

Within the monolithic concrete portion of the structure, a number of large beams were post-tensioned where size limitations or necessary openings made conventional reinforcing alone impractical.

The general contract for the stadium included 5 million cubic yards of earthwork. This was a huge excavation into a hillside to grade the site for the structure. The material was used to fill tidelands to create the large parking areas. The general contractor was Chas. L. Harney, Inc.

Founded on rock

Located on Candlestick Point in the southeast corner of San Francisco, just off the Bayshore Freeway, the stadium nestles in the huge cut excavated from the side of a high hill. The big parking lot reclaimed from San Francisco Bay tidelands will accommodate more than 9,000 automobiles. The entire area occupied by the structure was excavated into rock, providing an excellent foundation.

(Continued on page 11)



A prestressed seat support for the second deck is in place, and a workman is about to tighten the lag-screw expansion anchor that holds the unit in place. The man at left will plaster up the holes over the countersunk lag screws.

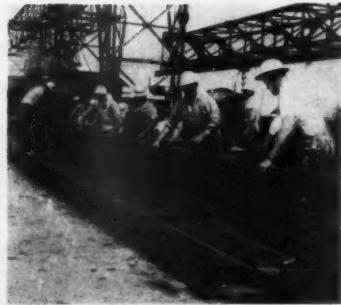
Seat supports for stadium precast at plant

The twin casting beds at the Petaluma, Calif., plant of Ben C. Gerwick, Inc., got a real workout producing the 3,045 precast-concrete seat supports for San Francisco's new Candlestick Point Stadium. The 1,000 units for the upper decks are prestressed, while the 2,045 lower-deck pieces have conventional reinforcing.

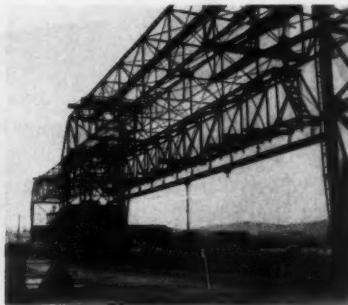
The L-shaped sections were made in a wide variety of shapes and sizes to fit the curvature and slopes of the stadium decks. Typical prestressed upper-deck sections have a horizontal leg 2.75 feet wide increasing from 2½ to 3 inches in thickness and a vertical leg 5 inches thick and 16½ inches high. Lower-deck sections are 3 feet 6 inches wide and 8.5 to 10 inches high. Lengths range from 5 to 26 feet. Here's how the prestressing operation was done...



The five $\frac{3}{8}$ -inch prestressing strands have been pretensioned, and workmen with H&B tie-wire reels are tying in the welded-wire fabric reinforcing. The 100-foot-long steel forms are set in four rows in each of the twin casting beds.



Bulkheads are clamped in place, and workmen set the form for the front face of the vertical leg. Three prestressing cables lie in the base of the vertical leg, two in the horizontal leg.



Casting operations proceed simultaneously in the two parallel beds, each of which is served by a gantry crane with a span of 125 feet. In the foreground, concrete is being placed in the lower-deck units.



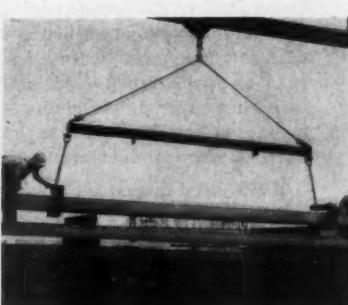
The overhead gantry crane has picked up concrete in a Gar-Bro bucket and spots it over the forms. The men roll the bucket along on the monorail carrier as they fill the horizontal portion.



Viber electric vibrators work the concrete down in the forms, after which it is struck off and finished. The surface of the sections at the left has been finished; holes will be left for coil-bolt fasteners.



When the horizontal leg has been finished, the crews place concrete in the vertical leg, using a portable hopper to guide the mix into the narrow form. The mix is consolidated by Viber units.

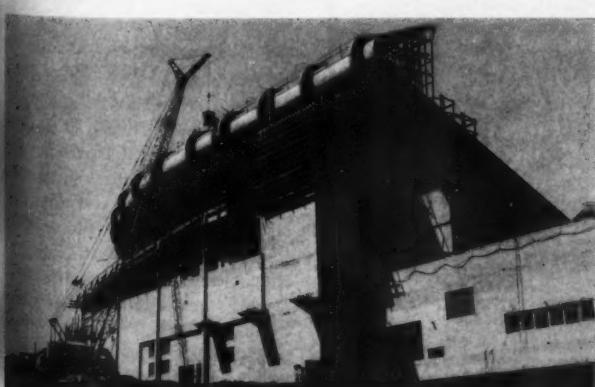


The units are steam-cured overnight, removed from the forms, sprayed with Horn-cure, and transferred by the gantry cranes to stockpiles. Later, cranes load them onto trucks for the 40-mile trip to the job site.

A Lima 60-ton truck crane positions one of the 41 reinforced-concrete A-frames; these support upper-deck seat girders that cantilever more than 20 feet over the outside of the stadium. Another of the frames is in place. The A-frames are set two to four stories above the ground.



Prestressing comes into use for cast-in-place concrete girders that support the lower seven rows of upper-deck seats and the press boxes. A Freyssinet-system jack has applied initial tension. A Simplex jack is used.



A big Lima with 105-foot boom and 20-foot jib hoists concrete to the top of the stadium for the closing strip between the curved wind-baffle wall and the precast-concrete roof tees.

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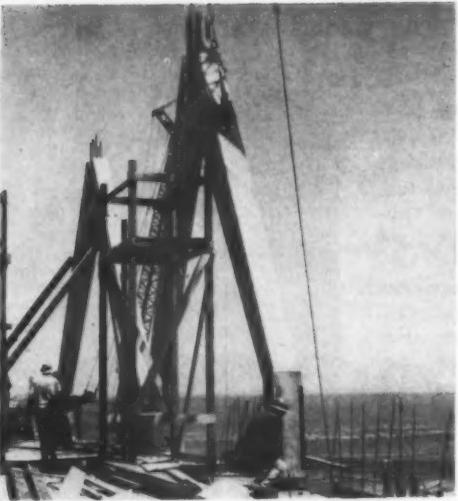
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ENGINES

NOVEMBER, 1959

(Continued from page 38)



Steel base plates in the legs of the A-frames supporting the upper-deck cantilever match steel plates embedded in the concrete of the deck. When A-frames have been positioned, the plates are welded together.

Some of the rock excavation was processed through a big Universal crushing and screening plant to produce 150,000 tons of base material and 50,000 tons of hot-mix aggregates for the parking lot and roadway surfacing.

Harney's crews started the earthmoving operations in March, 1958, and worked straight through nearly 18 months to complete the grading and paving this fall. Work on the structure got under way late in October, 1958, and continued for a solid year without any appreciable lost time because of the weather.

The rock hillside under more than half of the horseshoe-shaped struc-

ture was graded to the slope of the lower-deck seats. In this portion, the grade beams, which are the stringers, were cast integrally with 12-inch round footings that were excavated just a short distance into the rock.

On the side away from the hill, the structure was built up from footings in the rock, but the space below the lower deck seating is used for such things as clubrooms, concessions, and storage.

Precast seat supports

The lower deck is a relatively simple reinforced-concrete structure consisting primarily of the sloping stepped seat girders. Spanning between these girders are the precast lower-deck seat supports. These units—some 2,045 of them—were cast at Gerwick's Petaluma casting plant, then trucked to the job and set in place by the Independent Iron Works Inc., Oakland.

These seat-support units are L-shaped in cross section with a horizontal leg 3.5 feet wide that tapers from 3 to 2 inches in thickness. The vertical leg ranges from 8.5 to 11 inches high and is 6 inches thick. The units vary in length to fit the shape of the stadium, but most of them are 20 to 24 feet long. They are cast of lightweight concrete, reinforced with welded-wire fabric.

The stadium seats, furnished and installed by American Seating Co. Inc., Grand Rapids, Mich., are attached by expansion anchors to the vertical leg of the seat supports. The finished surface of the seat support is the stepped "floor" of the deck. Walkways between the sections and a few of the seat supports were cast in place to provide lateral stiffening members for the seat girders.

Most of the precast seat supports for the lower deck could not be placed until the second-deck shoring had been removed. Setting the units from the edge of the playing field inside the stadium required a crane with a very long reach. Independent Iron Works used an Insley 35-ton truck crane with as much as 130 feet of boom and jib. When work was being done under the second-deck cantilever, this crane passed the precast units back to a crew using an A-frame and an air tugger to work them into place.

Upper deck is complicated

The real construction problems were found in the upper deck of the structure. The lower portion of this deck, including the press boxes and some of the seating, cantilevers over the lower deck. The high end of the upper deck cantilevers over the outside of the lower part of the structure. This outside cantilever also carries a series of large boomerang-shaped precast members that support a precast wind-baffle section and a 22-foot-wide roof section made up of precast prestressed double tees.

One of the basic members of the second-deck structural system is a

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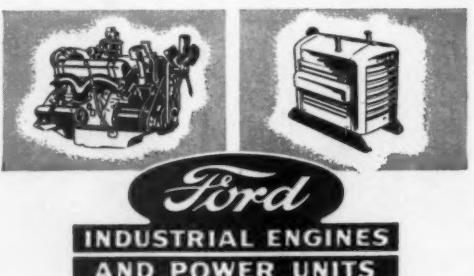
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concrete neutralizing beam supported on 12-inch round solid steel columns at 48-foot centers. This beam extends a total of 960 feet over 21 columns with only one expansion joint. The columns, which are exposed, are located about 10 rows out from the back of the lower-deck seating section. The beam is 24 feet high and steps from 10 to 10 inches in thickness.

Beams are post-tensioned

This vital structural member could have been designed with conventional reinforcing had it not been necessary to provide a large number of openings through it for walkways and other access. In the areas where these openings are provided, the big beam is given an extra measure of reinforcing by the installation of four 12-wire 0.276-inch prestressing cables. These were post-tensioned by the Freyssinet method after a considerable portion of the dead load had been applied to the beam.

The girders, which cantilever out beyond the big beam to support the lower seven rows of upper-deck seats and the row of press boxes that stretch completely around the stadium, are also prestressed. These girders extend back horizontally from the neutralizing beam to support the horizontal top-level floor of the structure and provide the backbone for the cantilever portion.

These girders are continuous over three supports and then cantilever out a total of 26 feet more. The two 12-wire 0.276-inch prestressing cables are approximately 70 feet long. These were also post-tensioned by the Freyssinet system.

Precast on job site

Several important structural elements of the stadium, including the big A-frames and boomerangs for the outer portion of the upper deck, were precast on the job site. These elements are not prestressed.

The 12-ton A-frames measure 24 or 26 feet across the bottom and 23.5 feet high. They were cast 10 at a time in two beds set up in the parking area adjacent to the stadium. The A-frames rest on the edge of the upper-level floor, two to four stories above the ground, and support the upper-deck seat girders that cantilever more than 20 feet over the outside of the rest of the structure.

Harney used a 60-ton Lima truck crane to raise the A-frames into place and hold them while steel base plates in the A-frames were welded to steel starters in the deck. Adjustable shoring braces held the frames upright while the concrete girder at the top was being formed and cast.

Spectacular job

Forming and casting these cantilever girders high in the air was a spectacular part of the work. The contractor used towers of tubular scaffolding—of Harney's own design and made in the contractor's shops—to support the overhanging forms. Some of this high concrete was placed by a Lima 25-ton truck crane using 100 feet of boom and jib, but the highest reaches were made with

the big 60-ton Lima. The transit-mix concrete was hoisted in Gar-Bro 1-yard buckets.

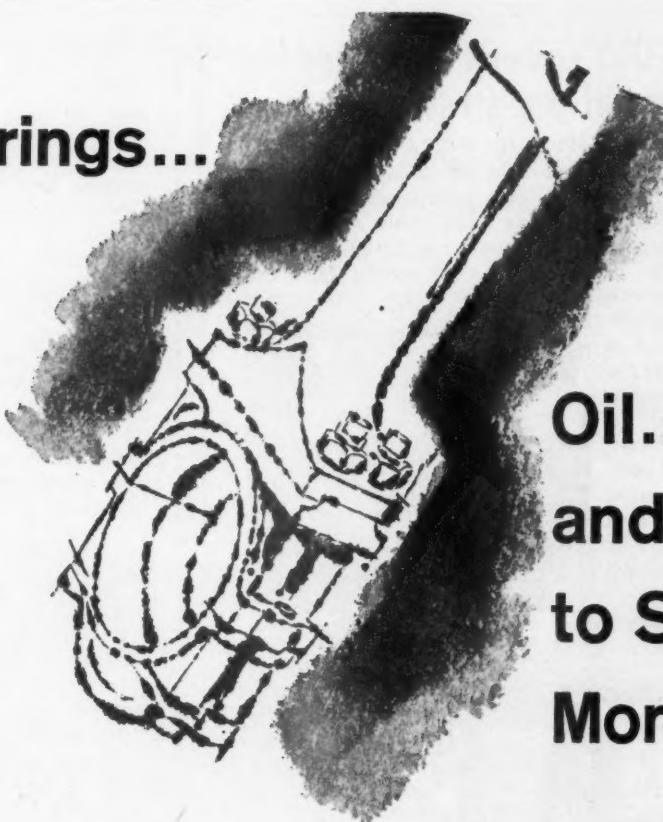
At the outer end of the cast-in-place cantilever girders, the boomerang-shaped precast members were attached. They cantilever forward over the upper seven rows of seats of the top deck to support a roof and windbreak. These boomerangs, which weigh about 11 tons each, measure 25.5 feet long. They are 16 inches thick and taper from 36 to 18 inches in depth. Forty-four of these units were cast on the same casting beds where the A-frames were made. They were set in place by the big Lima crane and welded to inserts in the cast-in-place members.

Fitting into the curve at the lower
(Continued on next page)



Typical forming for the second-deck floors consists of Spanall adjustable steel joists supported on ledgers on the beam side forms. The Spanalls carry steel pans.

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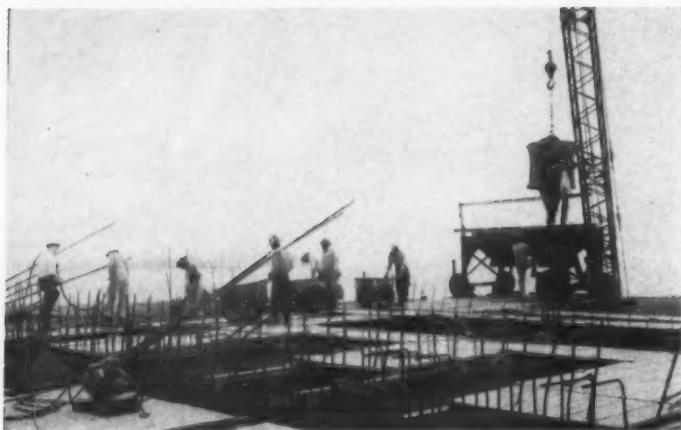
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Hand buggies, used to bring concrete to the point of placement during work on the second-level deck, are kept supplied by the Gar-Bro double-compartment hopper. The Homelite electric plant, foreground, supplies power for vibrators.



Utility trenches are excavated in the very rocky material next to the stadium by a Gradall. The Gardner-Denver 900-cfm rotary compressor supplies air throughout the entire job by means of a 4-inch aluminum pipe.

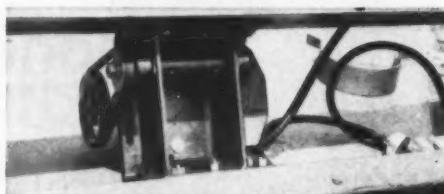
2 NEW STOW screeds - designed for manufacture of pre-stressed beams

A new ADJUSTABLE AMPLITUDE VIBRATING SCREED, which is adjustable for maximum efficiency of vibration on any given job, has just been introduced by STOW Manufacturing Co., Binghamton, New York. Adjustment is made by releasing the set screws, and turning the eccentric on its axis. Tightening the set screws locks the eccentric in its new position. The amplitude thus achieved is sufficient to propel the screed while the operators simply guide it along the side forms. The new screed is comfortably light in weight (140 lbs. for a 4-foot length) which makes it easy to lift over depressors.



New Stow Adjustable Amplitude Twin Beam Screed being used by Maule Industries, Miami, Florida

Note set screw underneath.



Here a new Stow lightweight aluminum DUS Vibrating Screed is being used by Formigli Co. to strike off and finish their prestressed concrete beams. This extremely lightweight screed (about 46 pounds for a 4-foot length) is low in cost and recommended for use wherever the twin beam screed is considered too heavy. It is powered by a 3/4-h.p. DU Electric Vibrator which can be removed from the screed if desired, and used as a vibrator.

For more information on the two STOW vibrating screeds, fill out and mail the coupon below.

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For more facts, use coupon or Request Card at page 18 and circle No. 280

(Continued from preceding page)

end of the boomerangs are precast semicylindrical wind baffles. These units are 25 feet long, about 9 feet high, and have an outside radius of 5.67 feet. Increasing in thickness from 5 to 6 inches, the lightweight sections weigh about 3.5 tons each. These units close in the space between the last row of seats and the beginning of the roof.

The roof consists of precast, prestressed-concrete tee sections supplied by Gerwick's Petaluma plant. They rest on flanges near the lower edges of the boomerangs. While the baffles and roof tees are not extraordinarily heavy, the high lift and the necessity for careful handling gave even the big 60-ton crane a workout during this operation.

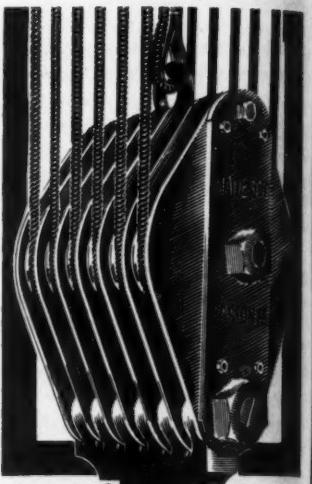
Seat supports pretensioned

The upper deck's 1,000 seat-support units span considerably greater distances than those of the lower deck. These precast units were pretensioned with five 3/8-inch pretensioned strands. These units were also produced by Gerwick at Petaluma and were set by Independent Iron Works in the same manner as for the lower deck.

However, because of the great



Elmer Cross, left, is project superintendent, and Ed Kemp is assistant superintendent. Both represent MacDonald, Young & Nelson, San Francisco, which was employed by the general contractor, Chas. L. Harney, Inc., San Francisco, as manager of construction.



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CONTRACTORS AND ENGINEERS



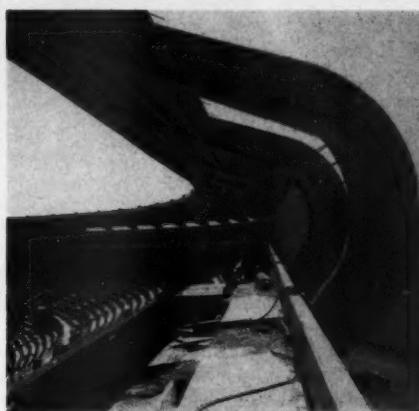
High double-scaffold towers support the cantilevered forms for the big beams that will carry the top section of the upper deck. The Lima 25-ton crane is placing concrete in the upper portions of the stadium.

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oughout the



Workmen cast one of the main ramps leading into the stadium. The 41 reinforced-concrete A-frames, the 44 boomerang-shaped roof supports, and the 42 wind-baffle panels were precast on the job site.

Precast, prestressed double-tee roof sections, precast by Gerwick, rest on flanges on the precast boomerangs attached to cast-in-place girders. Some of the curved wind-baffle panels are in place, background; seats are being installed, lower left.



height from the playing field and the extremely long reach, Independent brought in its Lima 60-ton truck crane, which carried as much as 180 feet of boom and jib. The top row of seats is about 100 feet above the playing field and about 160 feet away from it. Since this would have been an impossible reach, even for the big crane, the top few rows were placed from the outside.

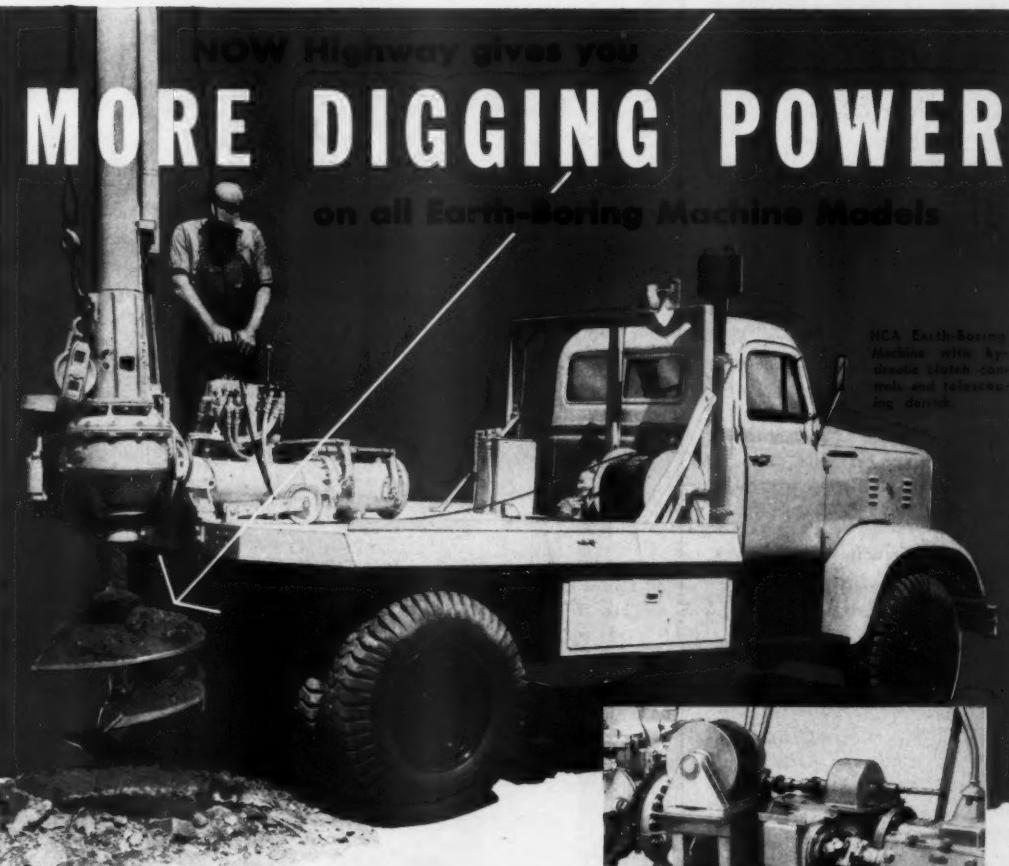
The seat girders, beams, walls, and many special sections were formed with lumber and plywood forms, and the concrete was placed by hand loggers. Ready-mix concrete was supplied by Consumers Rock & Cement Co., a Harney subsidiary, and was hoisted to the forms by the Lima cranes in Gar-Bro 1-yard buckets. Usually, the concrete was bucketed to a double-gated Gar-Bro portable hopper from which the loggers were filled. Homelite generators and vibrators provided the consolidation.

The flat floors for the two levels of the second deck were formed with Spann adjustable steel joists and sole steel pans. Where additional shoring was required, Acrow adjustable steel shores were used. The overhanging sections of the second deck were shored with Harney's tubular scaffold towers and with timber shoring. The Spannals and Acrow shores were also used to support forms for the cantilever ramps and walkways on the outside of the structure.

Personnel

Serving as project supervisors for Chas. L. Harney, Inc., through MacDonald, Young & Nelson, Inc., were project manager Dallas Young, project superintendent Elmer Cross, and assistant superintendent Ed Kemp. Harney's earthmoving crews worked under the guidance of superintendent Dave Harland. Harney's general superintendent is James Ahern. The crew of some 250 workmen on the structure was supervised by a large number of foremen.

Representing architect John S. Roll on the project were Bob Proctor and D. W. Mahaney, the latter serving as clerk of the works during different phases of the job. THE END



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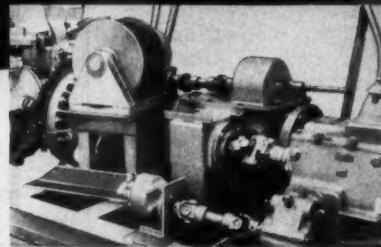
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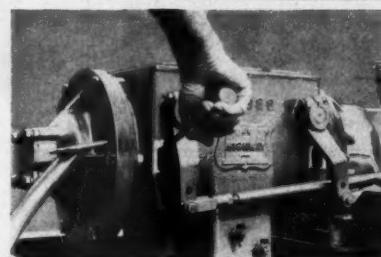
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Prestressed slabs are slip-formed

Casting machine turns out hollow-core prestressed units

A unique casting machine for prestressed slabs practically eliminates hand labor and requires no forms.

The machine takes concrete in at one end and pushes out a hollow-core slab at the other. Working somewhat like a slip-form paver, the machine receives three separate lifts of no-slump concrete, which it tamps and screeds to form the final product. No hand finishing is necessary.

The simple and rather remarkable process is currently being used at the Spancrete plant of the West Allis Concrete Products Co., Milwaukee, Wis. At the plant, located in nearby Waukesha, the unusual casting machine serves twelve 328-foot beds. Six of the beds are housed in a building so that operations can continue in bad weather.

After importing the machine and the method from Europe, Henry Nagy, president of the company, set up the plant in the summer of 1954. Since that time, several machines have been manufactured in this country. At present, West Allis Concrete Products is promoting their use in America. There are now two plants in operation.

The Spancrete plant produces 40-inch widths of prestressed hollow-core slabs 4, 6, and 8 inches in depth. The maximum span is 35 feet. The slabs, which may be topped with 2 inches of poured concrete, are used in either floor or roof construction.

The machine

The casting machine is suspended from a large gantry that spans a group of six beds. The gantry positions the machine and also moves it forward at a constant speed of 4.5 fpm.

Three different mixes of no-slump concrete are fed to the machine by two 1-yard buckets. A Clark fork-lift shuttles the buckets from the Smith 1-yard turbine mixer to the electric hoist in the gantry. The hoist lifts the bucket and dumps it in one of the three hoppers of the casting machine.

The pea-gravel concrete of the forward hopper forms the first lift and buries the double-strand prestressed wires. After the mix flows from the gate of the forward hopper, it is compacted by two up-and-down moving screeds.

The minus $\frac{1}{2}$ -inch expanded-slag aggregate concrete of the middle hopper puts down the second lift. This lift of lightweight concrete occupies the area around the tubes that slip-form the cores. The lift is compacted by three up-and-down tamping screeds.

The mixture of sand and cement from the rear hopper forms the third and final lift. This mix is scooped into the hopper by a man riding the rear of the machine. It is tamped by a screed forward of the hopper and is finished by two moving transverse screeds aft of the hopper.

In this way, the layer of lightweight concrete is sandwiched between two layers of fine-aggregate heavy concrete. The lightweight concrete reduces the over-all weight of the slab yet does not reduce its strength. When the slab bends under a full load, most of the stress is resisted by the upper layer of regular concrete and the tensioning strands in the lower lift.

The tongue-and-groove sides of the slab are formed by a 10-foot-long slip form. The core holes are formed by 6-foot-long tubes that nose their

way through the stiff concrete. Three electric motors, mounted on the machine, drive the eight moving screeds through an arrangement of connecting rods, lever arms, and one gear box.

Tensioning

Reinforcement consists of double strands of .101 or .120-inch-diameter stress-relieved steel wire. From 8 to 26 strands are required, depending on the length of the individual slabs. All but two of the strands are posi-

(Continued on page 46)

Suspended from a traveling gantry, unique casting machine makes a 328-foot run down one of the outside beds at Waukesha, Wis., plant of West Allis Concrete Products Co. Three no-slump mixes are used. Pea-gravel concrete from the front bin and lightweight concrete from the middle bin are packed by separate sand-tampers. The operator feeds sand-concrete into the end hopper; the material is smoothed by transverse screeds at the rear of the rig.

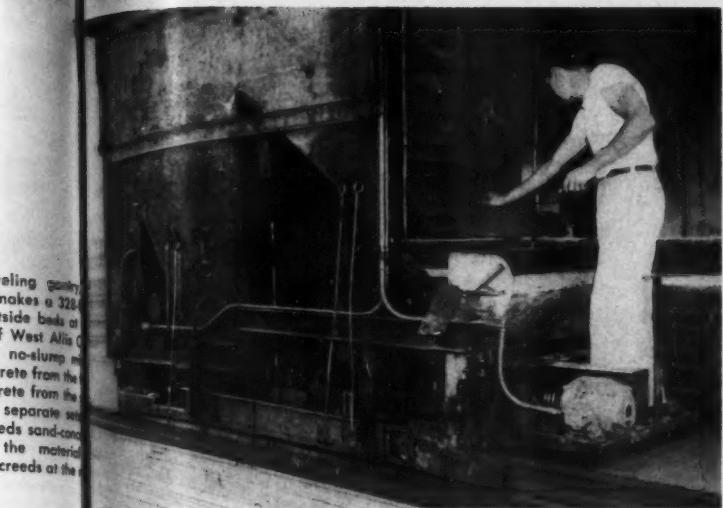
11% Ahead at W



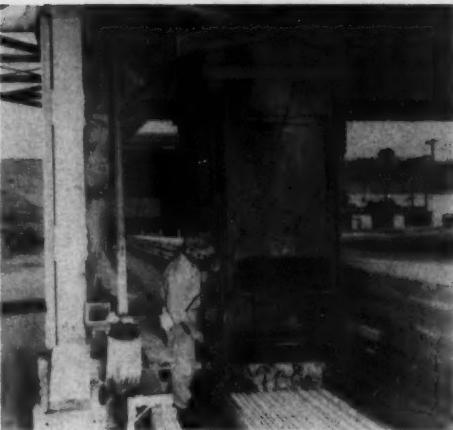
Phillips (left) and Morgan (center) show Williamson how planned lubrication prevented equipment breakdowns.



Williamson (left) and Morgan go over important lubrication points of truck used on Dyberry job.



The gantry, powered by electric motors, moves the casting rig along at a rate of 4.5 fpm. The double strands of steel wire, previously tensioned, are guided into the machine through slots at the front. Slabs are cast as many as eight high; no bond-breaking agent is needed with this type of concrete.



at Winter Shutdown!

Mobil PM System Given Credit by Hunkin-Conkey for Helping Speed Up Dyberry Flood Control Dam and Reservoir Project of U.S. Army Corps of Engineers

WHEN Hunkin-Conkey Construction Company, Cleveland, O., closed down operations for the winter at the Dyberry Flood Control Dam and Reservoir near Honesdale, Pa., it was 11% ahead of job schedule. Exclusive use of the Mobil PM System and Mobil products, resulting in better maintenance organization and performance, is given a large share of the credit for this fast progress by Frank S. Morgan, Hunkin-Conkey's General Superintendent on the Dyberry job.

Major equipment in use at the Honesdale project includes 12 Euclid trucks, seven bulldozers, three mixer trucks, two tractor-mounted drill rigs, two 2½-yard shovels and a one-yard drag-line. Planned lubrication made possible the steady, day-after-day availability of this equipment—an important factor in helping Hunkin-Conkey keep ahead of schedule.

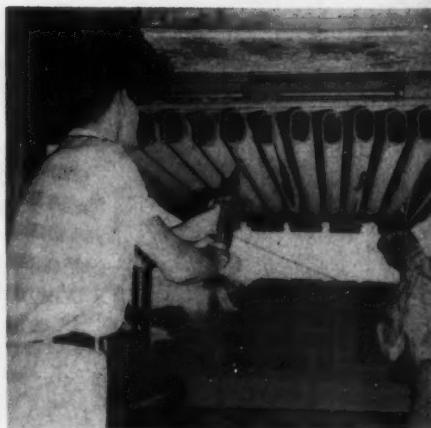
This case history clearly demonstrates the



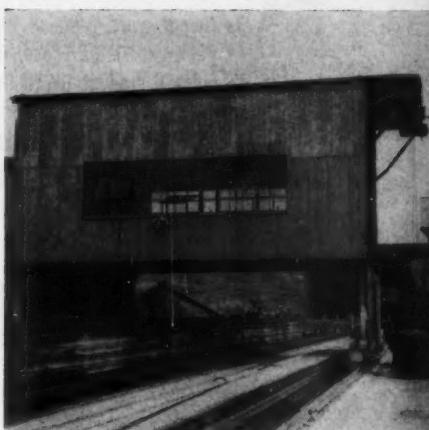
R. G. Williamson, local Socony Mobil representative (center), checks Mobil PM System equipment sheet with General Superintendent Frank S. Morgan and Equipment Superintendent L. C. "Joe" Phillips.

practical value of Mobil's PM System and Mobil products for contractors in saving valuable job time... boosting job profits... and in keeping their equipment working on the job *all through the job!*

Available—film on equipment safety, maintenance. Call nearest Socony Mobil office.



At the end of a run, the machine is raised by the gantry so that tubes that form the hollow cores in the slab can be cleaned. The forward ends of the 6-foot-long tubes are closed.



A Clark fork-lift brings a 1-yard bucket of concrete from the batch plant, background, to the traveling gantry serving the six outside beds. The gantry has an electric hoist that rides an overhead rail to deliver concrete to the casting rig, at extreme left under the gantry. Six inside beds, background, are also 328 feet long.

CONTRACTOR PM SYSTEM INCLUDES:

1. Record Folder—provides identifying date for each separate piece of equipment and holds equipment records.
2. Operator's Recommendation Chart—lists the correct lubrication recommendations for each piece of equipment.
3. Weekly Service & Inspection Report—
- an up-to-date record of condition of equipment, work to be done or completed.
4. Delivery Ticket—lists petroleum supplies delivered to equipment on the job.
5. "Squawk" Sheet—used by equipment operator to point out trouble spots that may need immediate attention.

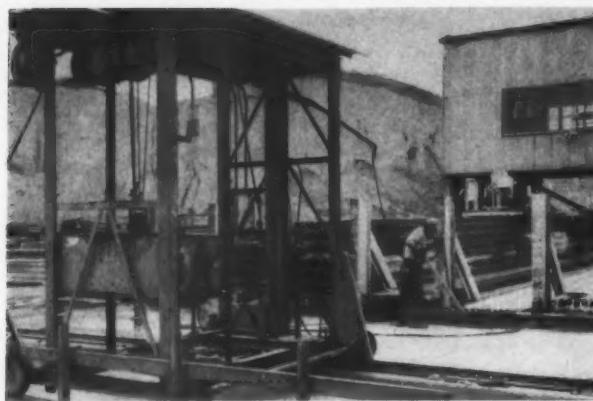


Correct Lubrication

ANOTHER REASON YOU'RE MILES AHEAD WITH MOBIL

For more facts, use Request Card at page 18 and circle No. 283





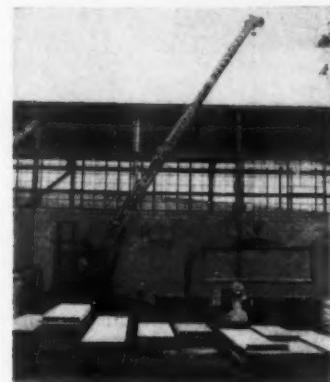
The two-strand Union Wire Rope cable is tensioned to between 140,000 and 150,000 psi by this gravity pulling device. The heavy rectangular block, foreground, pulls on the individual strands through an arrangement of shims and pulleys.

(Continued from page 44)

tioned about three-quarters of an inch, or an inch, from the bottom of the slab. The upper two strands re-

Spancrete does its own erection work. When the 40-inch slabs are being installed, they are placed side by side with ends resting on the bearing surface. The slabs, with their tongue-and-groove sides, are snugged close together. A 2-inch concrete topping may then be applied to the floor. In many cases, it is possible to grout the joints and place floor tile directly on the slabs. According to the company, one crew can install as much as 5,000 square feet of slabs per day.

With the help of a 5-man crew,



Completed 6-inch slabs are lifted from the storage area to a truck bed by a Bucyrus-Erie Hydrocrane. The building encloses six of the twelve plant beds.

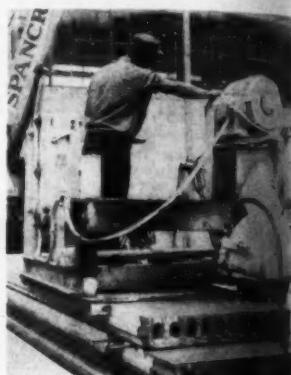
sist the reverse bending forces sustained during erection.

The strands are pulled individually by a gravity device to a loading of from 140,000 to 150,000 psi. The gravity device consists of a heavy weight, which is secured to the wire group by means of a series of shims and pulleys.

During the casting of the slab, the strands are guided into position by slots at the front of the casting machine. Strands are cut when the concrete reaches a compressive strength of 4,000 psi. This normally takes about seven days of water curing.

The slabs are cast one on top of another to heights up to 64 inches. Slabs can be cast on top of the previous day's work. Remarkably, no bond-breaking agent is needed to separate them.

Concrete saws cut the continuous slab to the desired lengths. The individual slabs are then lifted from the bed by a Bucyrus-Erie Hydrocrane and either placed on a truck or carried to the storage area.



An imported electric-powered saw with a Carborundum Co. blade cuts off the end of a slab. Most of the cutting is done on the bed; occasional sawing is done in the storage area to make slabs fit particular building requirements.

directed by plant superintendent Mel Wehr, the casting machine rolls out a lot of concrete daily. The machine produces about 4,200 square feet of slab per 8-hour day. An additional three men handle the cutting, shipping, and erection.

Spancrete sells its product locally to compete with other types of flooring and roofing. Depending on the size and location of the contract, the price of the erected slabs varies from \$1 to \$1.25 per square foot. According to president Nagy, the cost of setting up the new plant was about \$250,000.

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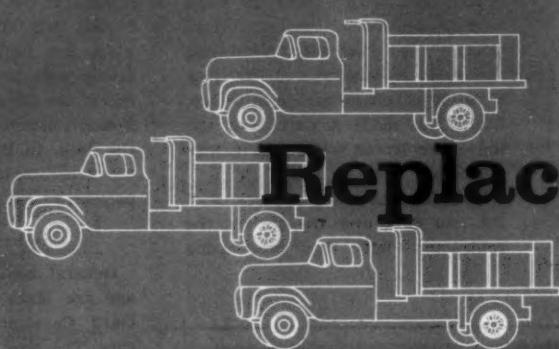
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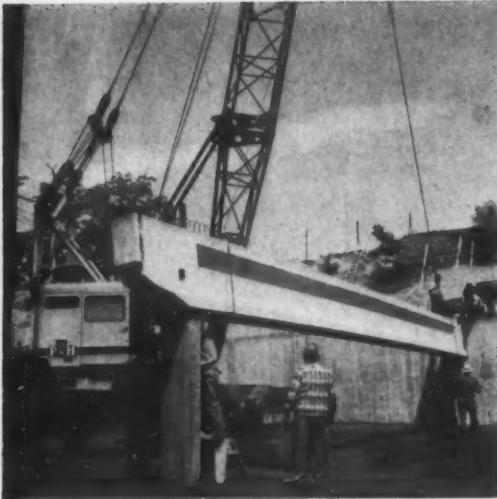
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Prestressed bridge girders give garage long, clear span

An 18-ton, 60-foot-long prestressed bridge girder is set in place for a 60-foot clear-span parking garage in Ogden, Utah, by a P&H 50-ton crane. One end of the girder rests on a seat on the retaining wall; the other rests on a short column. Plates in the ends are welded to plates on the seat and the column.

The combination of standard AASHO prestressed-concrete bridge girders and prestressed double-tee deck sections provided a 60-foot clear span for a parking garage in Ogden, Utah. This made it possible to use the entire lot on which the garage is located.

To reduce the potential cracking of the roof deck over the girders, the contractor left the prestressing

strands of the tees extending 3 feet beyond the ends of the sections. After the deck was placed, these cables were lapped back and forth across the joint and encased in the 3-inch concrete topping placed over the deck. In the 320-foot length of the structure, there are only two expansion joints.

Prestressing at plant

General contractors for the garage are Mark B. Garff, Ryberg & Garff Construction Co., Salt Lake City. The prestressed members were cast at the Salt Lake City plant of Utah Sand & Gravel Products Corp., Prestressed Concrete Division.

Preliminary operations on the site included the removal of 12,000 cubic yards of excavation, the construction of a 13-foot-high retaining wall along one side, and the casting of a row of 13 columns along the other side. The first-floor area was paved with 6 inches of gravel base and an asphaltic-concrete surface 2 inches thick.

AASHO bridge girders

Meanwhile, the 13 main girders were being fabricated at the Utah S&G plant. These are the standard AASHO Type III bridge girders with a length of 60 feet. The I-shaped section contains 50 pretensioned strands, of $\frac{3}{8}$ -inch diameter, in addition to conventional stirrups. Bonding loops of No. 3 bars extend out of the top surfaces of the girders to help anchor the decking to them.

The double-tee roof sections were cast in the same plant. These are 4-foot-wide sections 20 to 25 feet long, and with 16-inch-deep legs. Each leg carries two $\frac{3}{8}$ -inch pretensioned strands. These prestress-

After a girder is set, the P&H crane sets the prestressed double-tee roof sections for the second-floor deck. A complete deck section is laid before the next girder is set. Strands extending from tees are lapped back and forth across the joint and encased in the 3-inch concrete topping applied to the deck.



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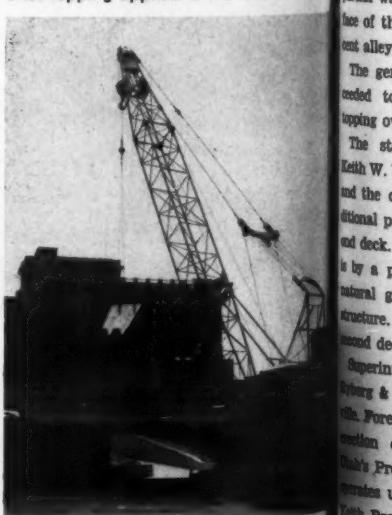
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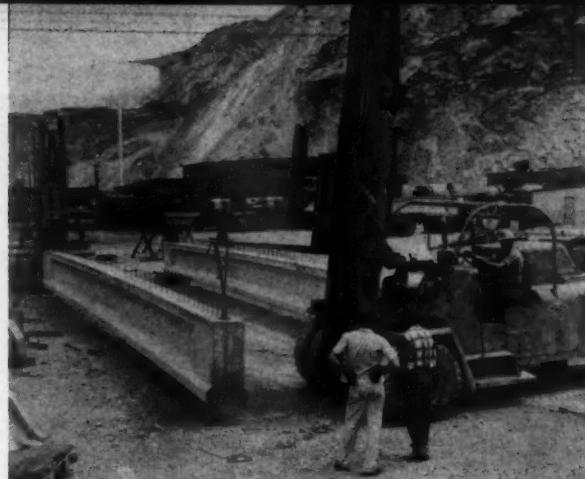
For more facts, use coupon or Request Card at page 18 and circle No. 286



CONTRACTORS AND ENGINEERS



A big girder is securely tied down to a Kenworth truck and the special trailer that make the delivery to the garage site.



The standard AASHO prestressed bridge girders are handled in the Salt Lake City yard of Utah Sand & Gravel Products Corp., by two Gerlinger H-40 lift trucks. Girders weigh about 18 tons.



ing 3 feet sections used, then and forth moved in the placed over length of only two ex-

the gar- Ryberg & Salt Lake members were plant of products Corp. on.

In the site 4,000 cubic construction wing wall stings of a the other was paved se and an 2 inches

in girders the Utah standard girders with shaped sec- and strands, in addition to wing loops of the top help anchor ions were These are to 25 feet deep legs. inch pre- prestress-

crane sets of sections complete the next building from north across 3-inch con- deck.

Use big motor crane

On the site in downtown Ogden, a 10-ton-capacity P&H truck crane supplied by Acme Crane Rental Co. picked the precast members off the trucks and set them directly in place. The girders were set so that one end rested in a prepared seat in the retaining wall and the other end on one of the 16-inch-square columns. Steel bearing plates in the seats and in the girder were welded together to hold the girders in place.

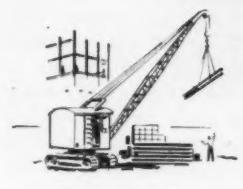
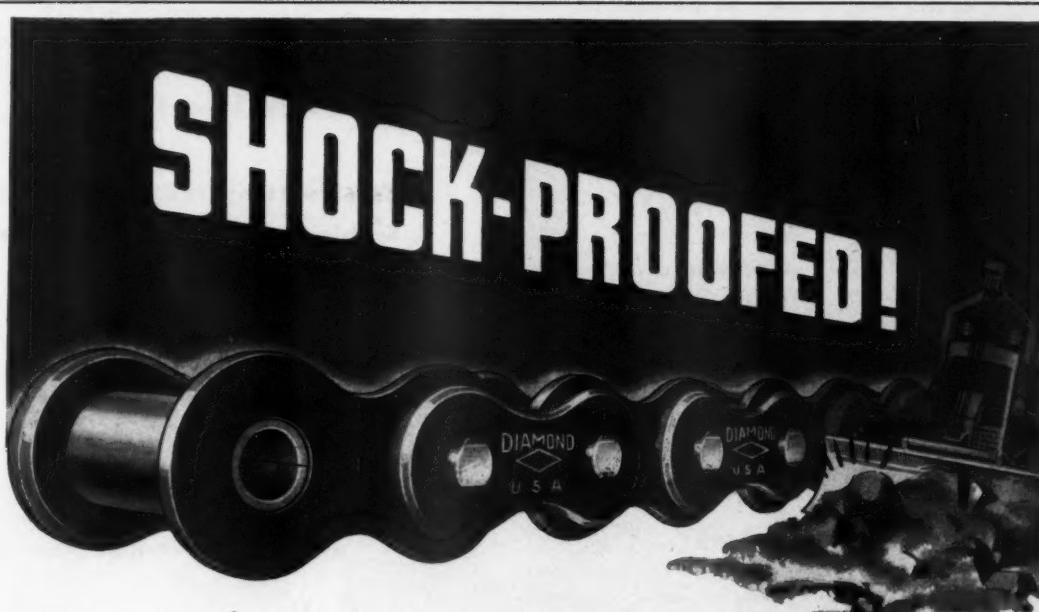
As soon as another girder had been set, the crane began placing the deck tees; these went into place very rapidly. A welder followed, welding together steel plates in the flanges of adjacent tees at four points along each of the panel joints between the tees. The loose prestressing cables at the ends were then interlaced across the girders.

When one bay had been erected, the crane moved back, set another girder, and proceeded to erect the next bay of tees. When the entire second-floor deck had been erected, the crane moved back and set some precast wall panels that provide a partial wall to finish off the exposed face of the building along the adjacent alley.

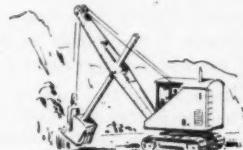
The general contractor then proceeded to cast a 3-inch concrete topping over the entire deck.

The structure was designed by Keith W. Wilcox & Associates, Ogden, and the design provides for an additional parking level above the second deck. Access to the second floor is by a paved ramp graded in the natural ground at the rear of the structure. A down ramp from the second deck leads to the street. Superintendent for Mark B. Garff, Ryberg & Garff was Blaine C. Glanville. Foreman for Utah S&G on the construction operation was Phil Krek. Utah's Prestressed Concrete Division operates under the supervision of L. Keith Bradley.

THE END



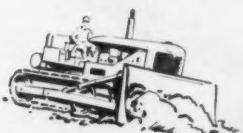
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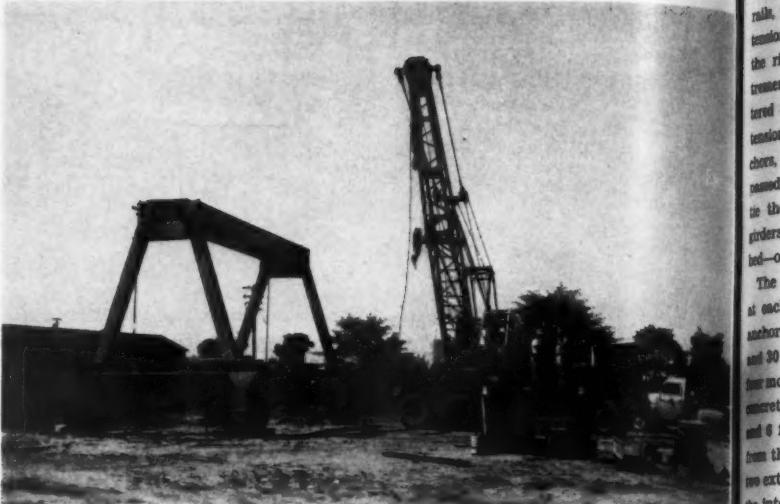
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In the early phases of work at the New Castle, Del., plant of Atlantic Prestressed Concrete Co., a Con-Va-Li, made by the American Conveyor Co., brings concrete to the forms. A Mall vibrator consolidates the mix.



Later, concrete placement, as well as wire stringing, and stripping and stockpiling of completed girder sections, is handled by two Travelifts, one of which is being assembled by a truck crane. The rig will ride along aprons straddling the casting bed.



At the jacking end of the 282×24-foot, three-row bed, Rodgers hydraulic jacks are supported by a specially built hydraulic lift that can position the jacks for prestressing draped strands.



At the dead end of the casting bed, vertical steel plates back up the strand template at the bottom for each of the three casting rows. The 9-reel rack of wire, background, is covered to protect the strands from the elements.

New plant handles draped and straight-strand girders, double-tee and universal beams as it expands to meet . . .

A demand for



by TONY MAVROUDIS, field editor

Versatility and economy were the most important considerations in the construction of the newest facility for Atlantic Prestressed Concrete Co.

This wholly owned division of the Warner Co., Philadelphia, Pa., a major supplier of ready-mix concrete throughout the Middle Atlantic states, was a new prestressed-concrete outfit slightly more than a year ago. Today, it has plants at Baltimore, Philadelphia, and at New Castle, Del.

A casting bed at the New Castle plant—the latest plant to open—is

capable of handling draped prestressing strands. The bed, having three casting rows, has an effective working length of 250 feet. Over-all dimensions of the bed are 282 feet in length and 24 feet in width. The casting-bed slab is strengthened by three reinforced-concrete longitudinal stiffeners poured with the 8-inch-thick slab. These stiffeners, spaced 7½ feet on centers, are 1½ feet thick and extend 2 feet 4 inches below the slab.

The main purpose of the slab stiffeners is to hold down the deflector

Two double-tee beds, the latest additions to the plant, supplied the members that were used to form the roof over this universal beam bed. The steel form sections are moved from row to row by an Austin-Western hydraulic crane.



isks, which are used to depress pre-tensioning strands, and to provide the rigidity necessary to resist the tremendous upward forces encountered when draped strands are pretensioned. No. 5 stirrup-shaped anchors, spaced on 12-inch centers and passed through the deflector rails, tie the rails in the slab-stiffening girders. There are three rails per bed—one for each row.

The casting-bed slab is supported at each end by reinforced-concrete anchorages 6 feet deep, 24 feet wide, and 30 feet long. Each abutment has two monolithically poured reinforced-concrete anchor columns, 6 feet high and 6 feet long, set about 10 feet in from the end of the casting bed. The two exterior columns are 2 feet wide; the interior column is 2½ feet wide. One set of columns supports the live or jacking end of the casting bed, while the dead or fixed end is supported by columns at the opposite side of the bed.

Draped strands

Atlantic Prestressed decided to build this latest type of casting bed because of the many advantages of using draped pretensioning strands. The bed can also be used as a conventional universal casting bed with only straight strands. It was felt that if the draped-strand method becomes the accepted pretensioning technique, the company would be spared the high cost of converting conventional beds for draped pretensioning.

The biggest advantage of draped-strand girders is that they have an increased load-carrying capacity without an increase in the girder cross section. Another advantage is that draped-strand girders or beams can be used in rigid-frame construction; this is not possible with conventional members.

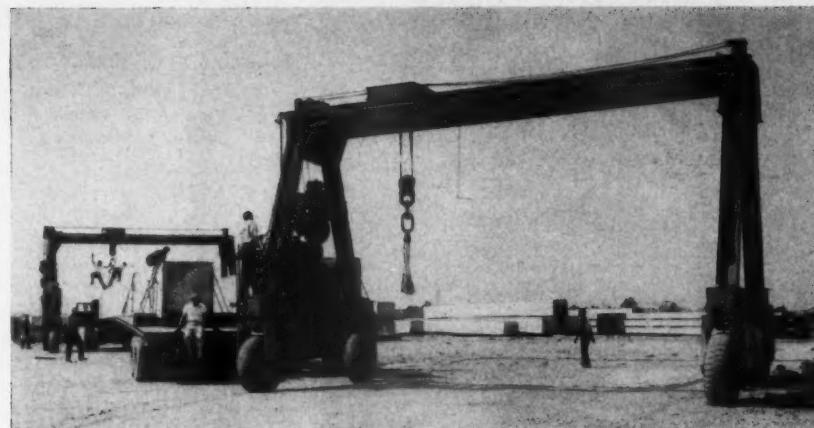
Plant operation

Atlantic uses two Rodgers 100-ton hydraulic jacks, supported on a roll-in cradle, to stress the strands during normal operations. Beacon Machinery Co., East St. Louis, Ill., built the hydraulic self-contained lift cradle, which has a 4,000-pound capacity, to raise and lower both jacks. The jacks work anywhere from 13 to 48 inches above the abutment surface. The upper elevation is used whenever draped strands are being tensioned.

Rebelling ½-inch, 7-wire strands, stored on a 9-reel rack behind the head end of the bed, are used for the bed. Nine strands are pulled simultaneously from the dead to the live end of the bed by one of the two 25-ton Travellifts at the plant.

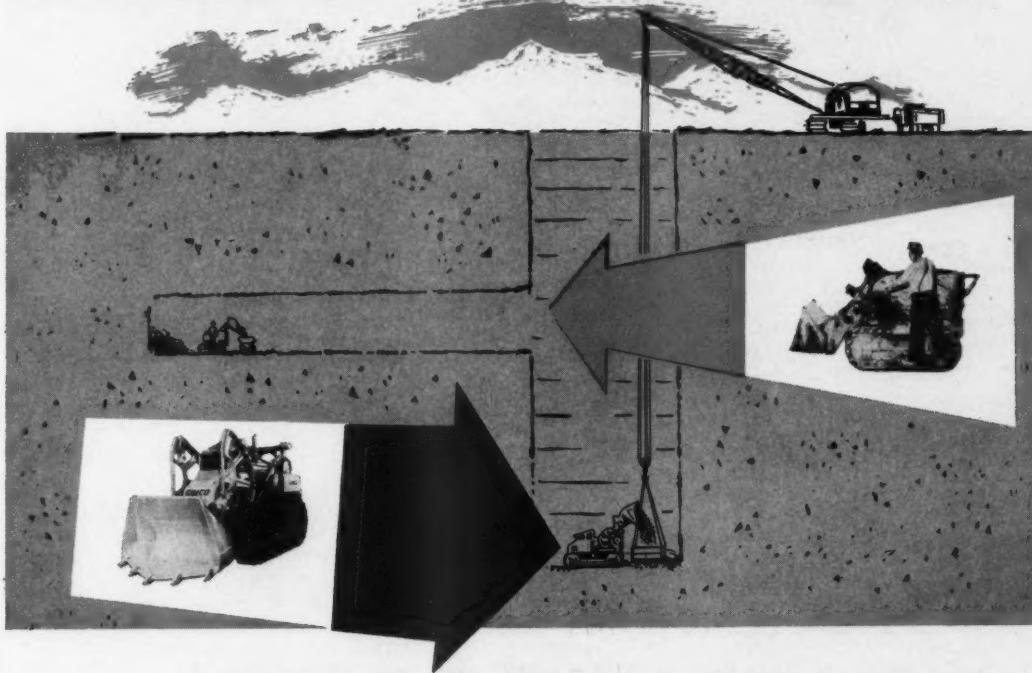
These Travellifts, straddling the bed, handle the placement of forms and the lifting and stockpiling of completed components. Equipped with rubber tires, and having a 28-foot horizontal clearance, the rigs ride on 2-foot-wide concrete aprons along the edges of the bed slab. They are able to run onto and off the beds as operations demand.

Embedded in the concrete apron
(Continued on next page)



In handling stockpiled girders, the Travellifts straddle the stockpile to pick up a girder, then straddle a lift truck to load a girder out.

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The machine was lowered to the bottom onto the newly-blasted rock by an 80 ton mobile crane. The same crane was then used to lower and, after loading, hoist, a truck

dump bed. Broken material was loaded on the shaft bottom by the Eimco 105, digging its way into the broken rock. Upon being hoisted, the dump bed load was dumped by swinging it into position over a Euclid truck, the "tag" line of the crane being used for dumping.

In shale, an Eimco 105 specially engineered short-coupled dozer with ripper attachment has been successfully used and in underground rooms, the excavator loads directly into a truck bed, carried on a flat-rack truck. Even in such tough assignments, the Eimco 105 excavator, which is diesel powered, showed a mucking rate as high as 125 cubic yards per hour!

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For more facts, use Request Card at page 18 and circle No. 288

(Continued from preceding page)

The dead end of the casting bed row consists of these vertical plates and the strand template, which is backed up by horizontal plates to maintain proper alignment of the Roebling strands. The cross-beams, top and bottom, are tied into the anchor columns that were formed as part of the abutment.



curbs are steam, water, and electric lines. A Hopkins' Volcanic steam boiler supplies 3,000 pounds of steam per hour at 100-psi pressure for curing operations. The water is used during the curing process. The electric lines are tapped along the bed to power the Mall electric vibrators used to consolidate the concrete.

Plant City Steel Corp., Plant City, Fla., supplied Atlantic with 500 linear feet of steel forms, including pallets, riser blocks, and side forms for beams. When the bed is being used as a conventional universal bed, bottom pallets are set over the deflector rails.

Pretensioning of all the strands in



LACLEDE 7-WIRE STRAND USED EXTENSIVELY IN PRESTRESSED CONCRETE SLABS FOR NEW YORK PIER

New Pier 40, a massive concrete structure 800 feet square, is taking form in New York harbor. When completed in 1960, it will replace five older finger piers and will be one of the most efficient ship handling facilities in the country.

Substructure of the pier consists of a prestressed concrete slab deck resting on poured-in-place concrete beams and caps, supported on steel H-piles.

Six thousand prestressed slabs were used to form the deck. They measure 1 ft. thick, about 5 ft. wide and 20-25 ft. long. A large portion of this structural material was pretensioned with Laclede 7-wire prestress strand.

General contractor for all substructure work on the pier was Stock Construction Corporation, under contract with the Department of Marine and Aviation, City of New York, whose engineers are Roberts and Schaefer Company.



Prestressed slabs for new Pier 40 were subcontracted to Garberro-Precast. They were cast in off-site prestressing beds and delivered to the harbor site ready for immediate installation.



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Detroit, Michigan

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Kansas City, Missouri
Memphis, Tennessee

Moline, Illinois
New Orleans, Louisiana
Tampa, Florida

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a row is done simultaneously. Strands are connected to a multi-hole strand template that butts up against vertical steel sections attached to cross-beams between the anchor columns. Elongation of the strands, which provides one measure of the amount of stress placed, averages 17 inches for the 250-foot casting bed. Concrete is furnished by Warner Co., which has a ready-mix plant about 15 minutes from the prestressing yard.

Since last year, Atlantic has built two double-tee beds, which are about the same length as the beam bed. By using some of the double-tee beams produced, the company has completely roofed over the two double-tee beds and the beam bed, and has provided an adequate area beneath the roof for future expansion.

Frank Perro is the superintendent of the New Castle plant for Atlantic Prestressed.

TUE DEC

ARBA reports on bridges, engineer consultants

■ Two technical bulletins have been issued by the American Road Builders' Association, World Center Bldg., Washington 6, D. C.

No. 244, "Standardization of Highway Bridges," reviews progress in the standardization of bridge components on both large and small structures, as well as the utilization of standard bridge designs as guides in accelerating production of plans for the superstructures of small-span bridges. It also covers methods of expediting bridge design and more efficient methods of considering alternate solutions for long-span structures through the use of new electronic-computer methods. Price of the bulletin is \$1.

"A Reference Guide for Negotiations of Engineering Services for Highway Work," No. 245, deals with the scope and fees for engineering services performed by consultants on express highway projects in the U. S. This bulletin is priced at 50 cents.

Manual provides data on aluminum structures

■ Data essential to designers, engineers, and architects concerned with stressed aluminum structures is provided in the "Aluminum Construction Manual," published by The Aluminum Association. The book presents for the first time computations of allowable loads for beams and columns of aluminum alloy 6061-T6.

The 5-part book covers the dimensions, weights, and properties of aluminum structural shapes; practices and data on riveted and bolted connections; beams and columns produced in alloy 6061-T6; nine tables which fulfill most structural needs; and miscellaneous reference data required by engineers and designers.

The \$3 book may be purchased from The Aluminum Association, 420 Lexington Ave., New York 17, N. Y.

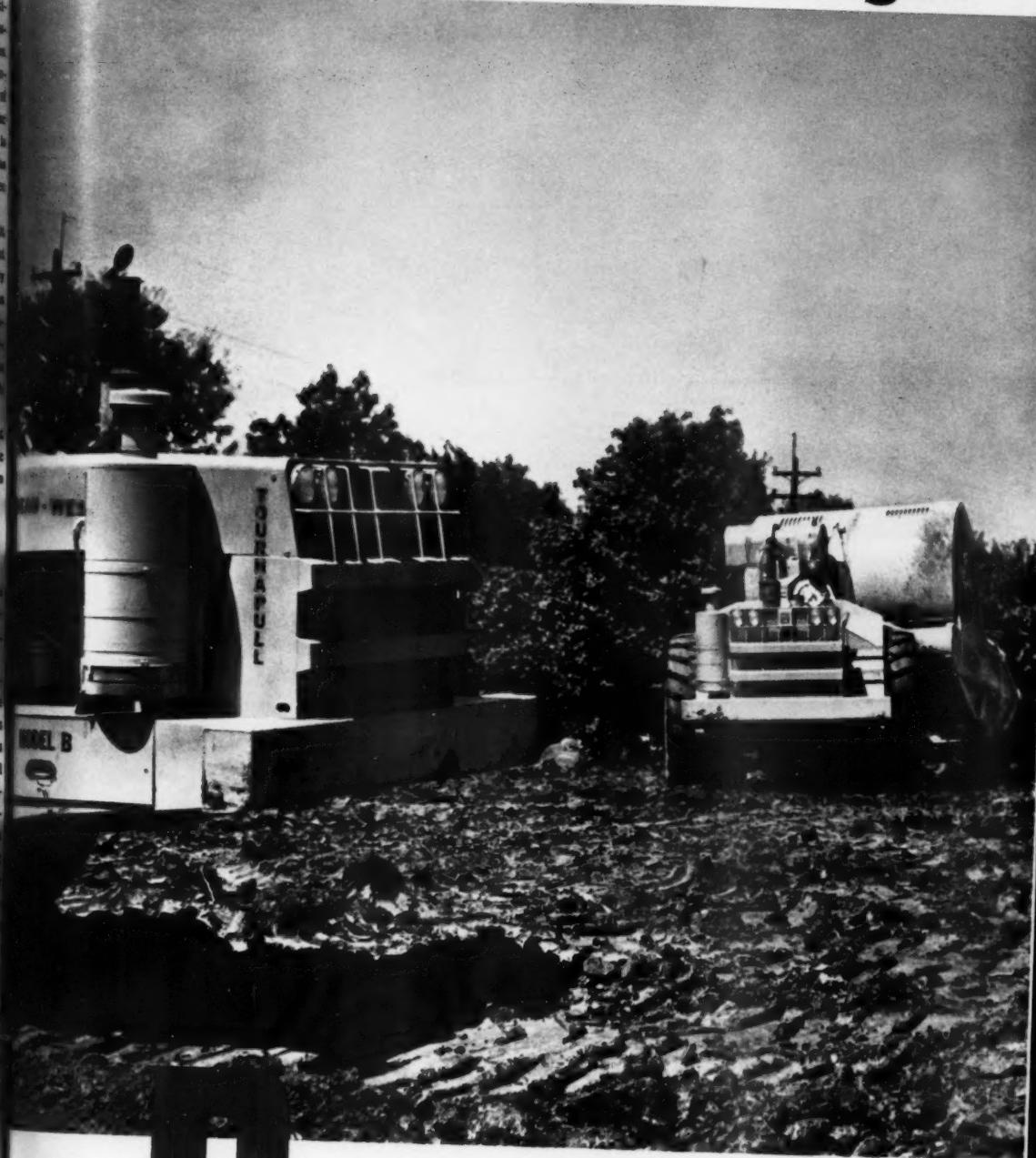
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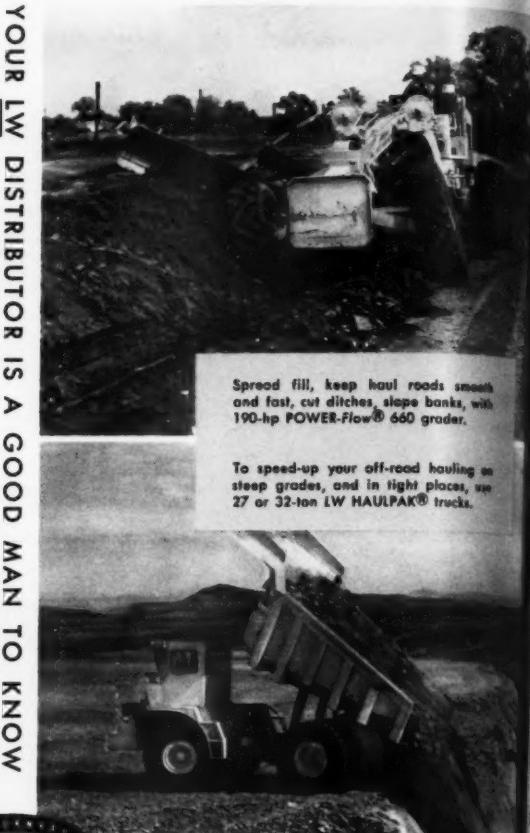
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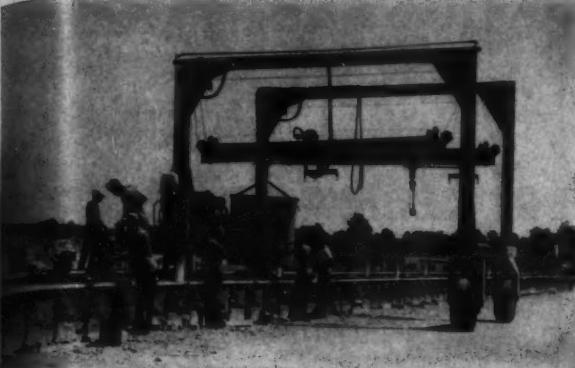
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Concrete is dispersed from an Insley bucket on a truss for a pre-stressed channel beam at the Stress-Con Division plant of Shute Concrete Products, Inc., Richmond, Ind. Form-Crete steel forms are used for beams made for Indiana University's new football stadium.

Medium makes wide use of prestressed concrete

The new football stadium at Indiana University in Bloomington, Ind., will make extensive use of prestressed concrete. About 3,300 prestressed-concrete channel beams will form the seats and walkways of the curved grandstand, which will have a capacity of 73,000 when completed in the fall of 1960. Shute Concrete Products, Inc., Richmond, Ind., will supply the prestressed-concrete members from its newly created Stress-Con Division plant.

Shute's new prestress plant and will cover a 900×300-foot area graded level with additional storage areas adjacent. The plant is built on an old flume sand-fill area with roads and work areas surfaced with compacted crushed stone. It consists of two oil-heated casting beds, each 360 feet long with gravity-type concrete chutes. A concrete batch plant with elevated aggregate and cement storage is in the center of the casting area. A Smith turbine-type mixer and a Travelift are used for mixing, placing concrete, and handling the forms. Heat is provided by a Cleaver-Brooks oil-fired boiler using heat-transfer oil through a piping system in the steel forms. The present casting cycle is completed in 24 hours. On completion of the stadium job, production will turn to the casting of floor and roof decks.

The channels for the stadium will range from 18 to 28 feet long and will weigh from one to two tons each. Specifications for the channels call for various stem depths, with perpendicular sides on the outside faces of the stems. Form-Crete all-steel forms are used. Channel members have been cast and tested to withstand a total weight of 1,045 pounds per linear foot without damage.

Planning plans new plant

A \$250,000 office building and warehouse will be erected at 5901 Fourth Ave. S., Seattle, Wash., by the Charles F. Young Co., Inc., Mt. Prospect, Ill. The building will have 5,500 square feet of air-conditioned offices and a lounge room, plus 12,500 square feet of warehouse area. Design of the building will permit ready expansion, through removable walls, to utilize all of the 70,000-square-foot tract.

Fundamentals of design in reinforced concrete

■ "Elements of Reinforced Concrete," by Sylvan P. Stern, combines theory and practical application in presenting effective methods for design in modern industry. A brief review of mathematics and physics as they apply to reinforced-concrete design is followed by a step-by-step development of elastic and plastic elements. A complete foundation design for a steel-frame building is then detailed by the author.

Next, a working set of drawings for the building is presented, showing the concrete lines, reinforcement, bar bending schedules, and a complete bill of material. Each drawing contains a detailed estimate of quantities of ma-

terial used, general notes, and typical reference sketches. The design problem familiarizes the reader with American Concrete Institute building-code requirements for the material and applications to the particular design.

Chapters detail flexural stresses in timber, plain-concrete, and reinforced-concrete beams; bond, shear, and diagonal tension; anchorage, embedment, and anchor bolts; reinforced-concrete columns; retaining walls; and detailing and drafting of reinforced-concrete structures.

Priced at \$10.60, the book is available from Prentice-Hall, Inc., 70 Fifth Ave., New York 11, N. Y.

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Ten umbrellas, each consisting of four hyperbolic paraboloid sections with the post-tensioned beams running from peak to center on the four sides, roof the new Reno Air Terminal building. Stressing cables are anchored in the projection at each peak. Workmen apply the 2-inch insulating board and built-up roofing.



Roof beams post-tensioned



The entire roof of the building was formed before concrete was placed. At this point, reinforcing steel is in place and four prestressing cables are in each beam running up to the red peak. Post-tensioning, done from the peak, was mainly to limit deflection of the shells for appearance's sake.

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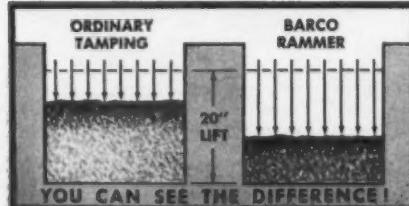
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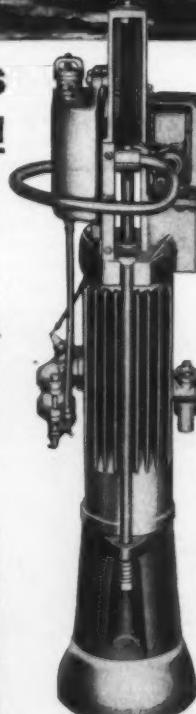
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Ten thin-shell concrete umbrellas, each consisting of four hyperbolic paraboloid sections, make up the roof of the new \$1.2 million Reno Air Terminal Building at the Reno, Nev., municipal airport. Each of the umbrellas is supported on a central steel column and has post-tensioned beams running from the peak to the centers of the four sides.

Tilt-up concrete wall panels were precast in stacks on the site and set in place against steel columns to provide most of the exterior walls of the unique 42,000-square-foot structure. The exterior and interior provide a

pleasing combination of architectural concrete, brick, terrazzo, wood panels and plastered walls.

Work on the project was started in June, 1958, by Brunzell Construction Co. of Nevada, Inc., and continued through the winter without appreciable lost time, although snow, cold, and morning frosts occasionally delayed the start of construction operations until the sun provided some warmth. Visqueen enclosures, burning salamanders, and a covering of hay for the concrete made it possible to place concrete for the roof slabs in midwinter.

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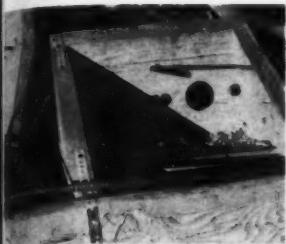
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CONTRACTORS AND ENGINEERS NOVEMBER 1959

sion air terminal building

Lightweight concrete used for tilt-up wall panels and thin hyperbolic paraboloid roof shells



Ends of two Prescon prestressing cables are held in place in forms before concrete placing begins. Once concrete work was done, it took two workmen only two days to tension the 176 cables in the roof.



Dead ends of the strands are anchored in the beams of the roof. Two of the 9-wire cables are anchored into the perimeter beam of the roof section; the other two are anchored about two-thirds of the way down.

Roof beams prestressed

Each of the roof sections is 60 feet square, with a heavy steel H-column in the center and similar but lighter columns at the corners. Each 30-foot-square quadrant of the section is built in the form of a hyperbolic paraboloid, rising from the marginal beam around the edges of the section to a peak at the center. These roof shells are of 3-inch-thick lightweight concrete.

The four roof shells of each 60-foot-square section are joined by four integral concrete beams running from the centers of the marginal beams to

the peak of the roof. Each beam contains four prestressing tendons, each made up of nine 0.25-inch wires greased and wrapped in Sisal Kraft paper.

Two of the cables have dead-end anchors in the marginal beams. The other two stop off with anchors about two-thirds of the way down from the peak. The post-tensioning was all done from the peak of the roof. One of the primary purposes of this prestressing is to limit the deflection of the shells for the sake of appearance.

The button-head prestressing tendons were supplied by Prescon, Los

Angeles, but were installed and tensioned by the steel subcontractor, Nevada Steel Erectors, Inc., Reno. To equalize the load on the anchorage block at the roof peak, the contractor tensioned, simultaneously, two beams on opposite sides of the roof. Two Simplex 75-ton hydraulic jacks, powered from an electrically driven pump, applied a total force of 270 kips to each beam. With this equipment, two workmen tensioned the 176 cables in the roof in two days.

As the roof deck was cast, it rested on the central column and the four corner columns of each section. Then, as the beams were stressed, the edges of the shell raised themselves free of the corner columns so that the entire umbrella was supported on the central column. When the post-tension-

ing was completed, the connections to the corner columns were welded into place.

Form entire roof

Brunzell formed the entire roof of the building before starting the concrete placement. The 3/8-inch Plyform decking on 2x4 joists was supported by 4x6 stringers at 6-foot centers shored with double 4x4 shores and Quick-Way clamps. The steel columns had been set previously.

This was in December, and temperatures ranged from below 20 degrees during the night and morning to highs of around 45 in the early afternoon. Placing and curing the concrete required additional heat, and the contractor enclosed the areas under the roof sections with sheets of 4-mil



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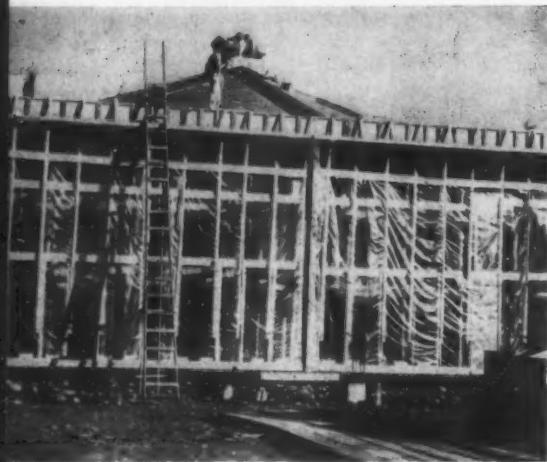
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NOVEMBER, 1959



(Continued from preceding page)
Visqueen attached to the outer rows of shores. Oil-burning salamanders and a few heaters were installed inside the enclosure.

Superintendent Roy Howell then scoured the countryside and located a generous supply of poor-quality hay that he was able to purchase at a low price. This was used to cover the concrete after it was placed. The combination of the enclosure, the heat from below, and the insulating hay kept the concrete warm enough to obtain the required 4,000-pound strength in about 9 days.

The concrete, which was supplied warm by the Ready Mix Co., Reno, was made with Basalite lightweight aggregate produced by Basalt Rock Co., Napa, Calif. The mix was placed by Bay City and P&H truck cranes using Gar-Bro $\frac{1}{4}$ -yard buckets and was consolidated with the aid of Master electric vibrators.

Tilt-up walls

A total of 68 large concrete panels for the exterior walls of the structure was cast in stacks on special casting beds arranged conveniently around the site. These panels were 30 feet wide, 6 inches thick, and ranged from 22 to 30 feet high, many of them tapering to match the roof line. Al-



Lightweight-concrete wall panels, pre-cast as many as eight deep on the site, are set in place by this Insley truck crane. Panels measure 30 feet wide and are from 22 to 30 feet high. W. J. Burke lifting hardware gives the crane a 6-point lift.

During concrete work on the roof, protection against cold is provided by Visqueen attached to the outer row of shores; oil-burning salamanders inside heat the underside of the roof. Hay spread over the concrete provides insulation from above and helps hold in the heat.

though they were made of lightweight concrete, some of them weighed as much as 22 tons.

The casting beds consisted of 2-inch concrete slabs cast on the ground. These beds and the surface of each succeeding panel were given a generous coating of Techkote curing and separating compound to provide positive separation. The wall panels were cast one on top of the other, with as many as eight in some stacks. Most of the panels required openings for doors or windows. These were formed out with wood forms, which were filled with sand to within an inch of the finished surface. An inch of concrete was cast over the top and finished to form a firm bed for the next panel.

Setting the heavy, awkward panels

was a job for a big crane and a careful crew. Brunzell rented an Insley 45-ton truck crane from Valley Crane Co., Sacramento, Calif., for the task. W. J. Burke lifting hardware installed in the panels gave the crane six points of attachment for the long lines from its I-beam strength. Breaking the panels loose and moving to lift them taxed the ability of the crane because of the long reach. Once the panels were tilted to the vertical, the crane easily carried them around and set them in place. The concrete wall panels were bolted to the steel frame of the building.

Early job problems

In addition to the precasting and prestressing, superintendent Howell had many other job problems. To be-

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and an employee installed an Inley Valley Crane for the last hardware installed on the crane car for the new stronger base and more the ability of the long steel tilted to the carrying them in place. They were bolted to the building.

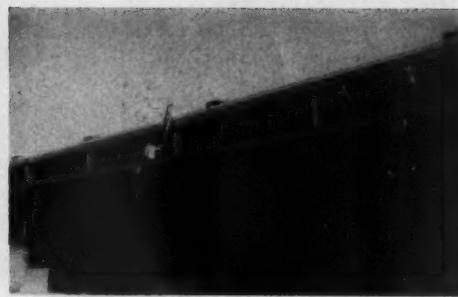
problems
precasting and
indent Howl
problems. To be



This portion of the structure will house ticket facilities. Here, parts of the hyperbolic paraboloid roof are exposed. The beams running from outer columns to high points of the roof were prestressed. Oil-burning salamanders keep the area warm.



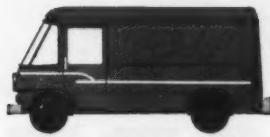
Inside the structure a workman cuts a plank with a SkilSaw. An oil-burning heater is in operation to keep the working area warm and to provide heat from below for the concrete roof. Salamanders were spotted throughout the building for this purpose.



Robertson steel decking on concrete tee-piers roofs the concourse in front of the terminal building. Workmen on the deck are installing supports for the glass and aluminum panels that, along with concrete and black brick, form the building face.



LINE pick-ups head their class in looks; load space, power. 4-wheel-drive optional.



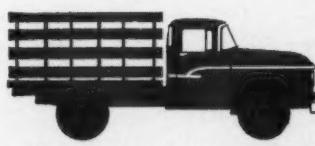
FORWARD-CONTROL chassis put famous Dodge dependability under the body of your choice.



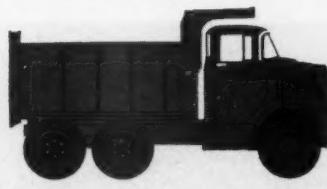
VAN and other special bodies are easily accommodated by most 1960 Dodge trucks.



STAKE models with compact new 89½" BBC trailers, bigger legal payloads.



STAKE bodies from 7½' to 14' are built by Dodge on models to 19,500 lbs. G.V.W.



TANDEM units provide top hauling strength for dump and other extra-rugged operations.

gin with, the ground water table was within a few feet of the surface, and footings had to be carried down as far as 14 feet. In the open gravel formation, this meant pumping lots of water. In one of the deep holes, four pumps operated continuously to keep the water down so that concrete could be placed.

The 6-inch reinforced-concrete ground floor of the terminal rests on a base of 6 inches of crushed rock and 2 inches of sand. A sheet of 4-mil Visqueen film was laid over the sand to serve as a moisture barrier before concrete was placed. The floor contains pipes for radiant heating.

Parts of the interior of the building are exposed the full 22 to 30 feet from the floor to the concrete roof shell. These include the ticket and baggage areas and the passenger lobby. Other areas have two full floors subdivided into many rooms for offices, restaurant, and other facilities. The 2-story areas have Seco 30-foot bar-joist floors covered with Steeltex and a 3-inch concrete slab. Interior partitions are made with metal studs covered with metal lath and plaster.

A loading concourse along the front of the building and fingers extending out from the terminal have tee-shaped cast-in-place concrete piers at 30-foot spacings with roofs of Robertson No. 5 Q-Deck.

Exterior walls of the structure combine painted architectural concrete, black brick, and aluminum and glass wall panels. The interiors range from wood panels of birch and black ash to terrazzo panels and plastered walls.

The concrete roof shell is covered with two inches of rigid insulation, a 4-ply built-up roof, and a finish of asphalt-base aluminum paint.

The structure was designed by Vhay & Grow, Architects, Reno, with Walter Constant of Sacramento, Calif., serving as structural engineer. Consultant on the prestressing was T. Y. Lin & Associates, Los Angeles.

Personnel

General superintendent Roy A. Howell on the Brunzell staff was assisted by carpenter foreman Harold Currie and general foreman Delmar Scott. Architect's representatives on the work were George Ferrari and Ted Messerschmidt.

The End



1

This **PAYLOADER®** is



2

**"Best piece of equipment
we have ever purchased"**

"The H-70 'PAYLOADER' with Drott 4-in-1 bucket is the best piece of equipment that we have ever purchased," says Peter J. Ellis, Vice President, Glenmar Construction Co., Inc., Rockville, Md. "It will move more dirt than any two competitive loaders that we have ever owned. We don't know how we ever did a job without it."

**"Most useful machine
I have ever used"**

"I am using the H-70 with 4-in-1 in all phases of this contract," says Max Hutchinson, Glenmar's foreman. "The 4-in-1 versatility on rubber tires makes it the most useful single machine that I have ever experienced using in my 15 years of pipe work. Gives unlimited advantages that can't be determined until the need arises. Saves time and operating cost."

For more facts, use coupon on facing page or Request Card at page 18 and circle No. 297



1

3

MORE than a tractor-shovel



2

4

The job: 16,000 ft. of storm sewer on Maryland State Route 193.

1. Glenmar's H-70 loading out excavated dirt unsuitable for backfill. The clam action of the 4-in-1 bucket does the job neatly and cleanly.

2. The powerful hydraulic clam action also grasps and moves old concrete curbing and chunks.

3. Pipe ranges up to 54" diameter — is carried to position for lowering-in.

4. Bulldozing, backfilling the trench, leveling and grading are also "PAYLOADER" jobs on this project.

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11-53



Prestressed Concrete Products Corp., Verona, Wis., uses a G. T. Bynum 10-ton hydraulic jack to stress strands to 18,900 pounds for the 310-foot length of a bridge-girder bed. Strands are held by Supreme vise grips. The plant, which also turns out double-tee members on a 220-foot bed, uses heating and handling equipment that makes the setup modern and efficient.



A winch, powered by an electric motor, handles the work of winding as many as six strands at a time from the reels at the opposite end of the girder bed.

Prestress plant stresses quality

"The quality of a product is remembered a long time after the price is forgotten," says Ray Palmer, president of Prestressed Concrete Products Corp., of Verona, Wis.

It was with this idea in mind that Ray set up the company's first prestress plant slightly over a year ago. For precise concrete casting, the beds are made of steel set to within a sixteenth of an inch.

The most modern handling and heating equipment is used in the

plant. Straddle-type carriers handle the concrete members and the form. Complete control of the curing cycle is insured by automatic controls installed in the boiler room. The instruments regulate, as well as record, the temperature in the beds.

By starting with up-to-date equipment and developing well trained crews, the company has been able to turn out quality concrete at a reasonable cost.

Located on State Route 69 south



The CF&I Image provides safety in action with Cal-Tie Wire

The safety-first contractor doesn't expose his workers to the hazards of working with cumbersome shoulder coils... he equips them with Cal-Tie Wire in a convenient belt-borne dispenser.

This method provides the safe, economical way to tie re-bars. It prevents eye and face injuries inflicted by the loose ends of shoulder coils,

makes close quarter work easier, keeps workers' hands free. Waste from cut ends is reduced. The job is done quickly and efficiently.

Cal-Tie Wire—the quality-controlled wire—is available in gages 14 through 20. The light-weight coils fit any standard tie wire dispenser. Call the nearest CF&I sales office for complete information.

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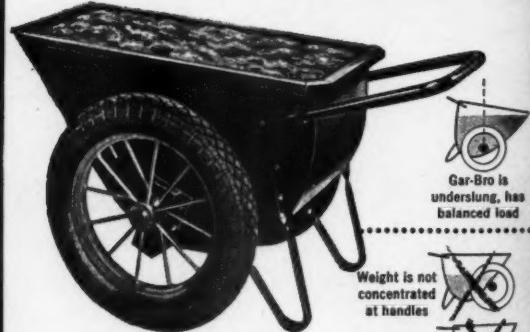
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6725

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GAR-BRO CONCRETE CART



Gar-Bro is underslung, has balanced load

Weight is not concentrated at handles

Gar-Bro Cart is not high, unstable



...makes a man want to deliver a full load!

When workmen race to work early just to get a Gar-Bro Cart there must be a difference. And Gar-Bro's balanced design makes that difference.

Gar-Bro Carts are designed specifically for heavy concrete... are balanced when fully loaded... are definitely lighter at the handles. They are easier to push, easier to maneuver, easier to control and pour concrete.

Here is a cart that is 25% lighter in weight than other carts; that will handle 30% more load with half the effort and yet it costs no more.

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GAR-BRO

CONCRETE
HANDLING
EQUIPMENT



THE WORLD'S MOST COMPLETE LINE

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CONTRACTORS AND ENGINEERS

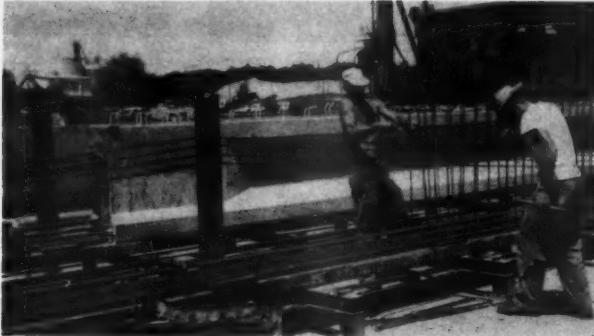


◀ Six reels of American Steel & Wire Super-Tens 7/16-inch strands supply the three girder beds. Each cable is stretched 30 inches for the length of the bed. Two 12-ton Travelifts, background, handle girder forms and completed girders.

Sections of reinforcing for girders are fabricated by a welder with a Hobart 250-amp machine and Atom Arc 1/8-inch low-hydrogen rod. Four sections are wired in place for one girder. ▶



Reinforcing sections are wired to each other and to the lower strands in a girder. Steel hold-up posts, left, carry the eight draped strands at the end of the 75-foot girder. A continuous steel channel supported by an I-beam frame forms the bottom of the girder. ▶

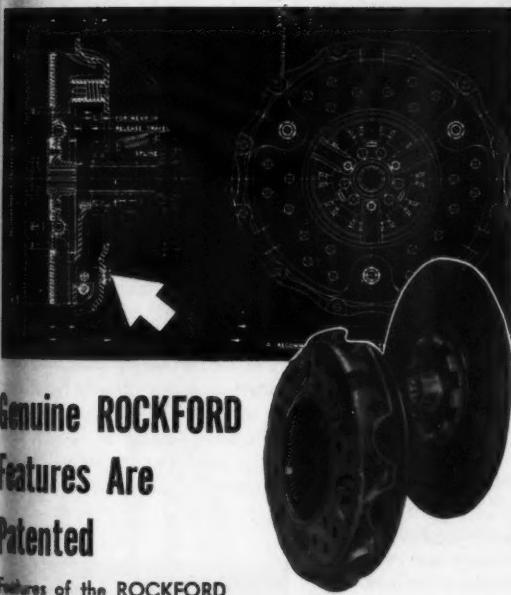


Verona, the company is an affiliate of Hartland Sand & Gravel Co., Inc. The plant makes use of the services of The Hartland Verona Gravel Co. and the Verona Ready Mix Co. The prestress plant is franchised by Leap Concrete, Inc., Lakeland, Fla.

At the plant, bridge girders are produced on three 310-foot steel and concrete beds. Another 220-foot bed turns out double tees up to 62 feet in length. Construction of two additional

(Continued on next page)

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CLUTCHES

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NOVEMBER, 1959



The eight draped strands are held by hold-down devices, such as this one, at about one-third points on a 75-foot girder. It is connected to a vertical steel plate embedded in the concrete beneath the girder. ▶

Increase production -- lower production costs



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-- designed for the sole purpose of providing a method of doing the job easier, faster and at lower cost.

For all your production problems—handling bulk raw materials, concrete construction and products, or maintenance — competent field engineers located throughout the country plus central engineering facilities are available to work with you and recommend the proper SYNTROn equipment.

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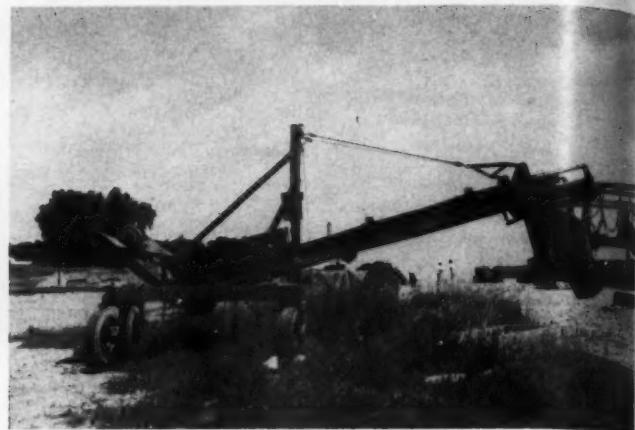
227 Lexington Ave.

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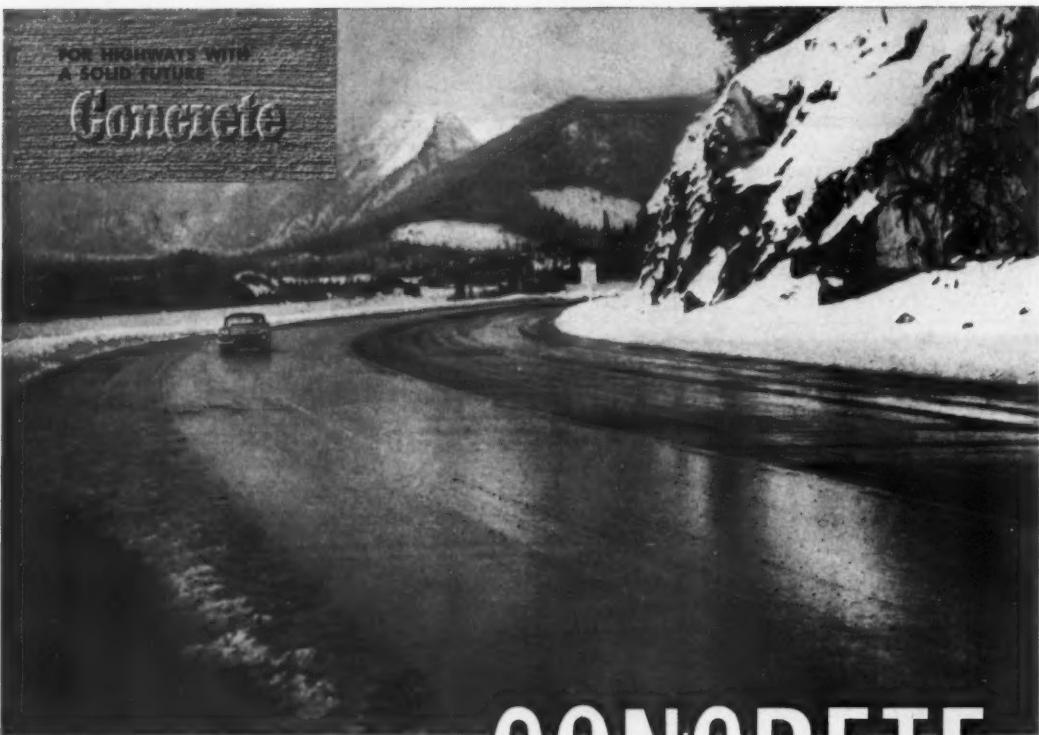


Extensive vibration is handled by workmen using Wyco electric vibrators with 1-inch heads. Vibrators are plugged into an outlet at one end of the bed. A Challenge 7-yard mixer on a GMC truck delivers concrete to the forms.



This conveyor arrangement was devised by the company to place concrete in the middle line of girders. The 4-wheel rig is pulled by the ready-mix truck. Concrete drops to the 24-inch belt, which dumps through a short funnel to the form.

(Continued from preceding page)



For Snoqualmie Pass, it's CONCRETE...

the only pavement with built-in protection against weather damage

High in the Cascade Mountains of Washington, new Interstate 90 year in and year out must face the toughest punishment weather can give.

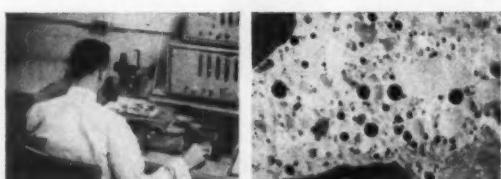
Snows are mighty heavy in Snoqualmie Pass. 30 feet a year is nothing unusual. For 5 months every year, it takes the biggest and heaviest snow removal equipment in the business to keep the road passable.

Traffic is plentiful and, when the road is posted, every car uses chains designed to take a deep bite. This is really tough on the road surface—but concrete is meeting every test.

As a special safeguard, bubbles by the billions (air entrainment) have been put into this concrete. And through temperature changes and repeated freezing and thawing, the surface is kept free of any scaling or break-up. Even tons of de-icers can't cause harm.

Here's a perfect example of the stability found in con-

crete under the most difficult and extreme conditions. One more reason why you're seeing so many new concrete highways. They are stretching out mile after mile on Interstate and other heavy-duty routes everywhere.



Checking bubbles by the billions, the "air void analyzer" gives an electronic control on air entrainment. Some 5 million bubbles per cubic inch of concrete (magnified specimen at right) give freezing moisture the room to expand.

A minimum of movement on the girder is insured by the cutting sequence. Strands are burned two at a time, the draped strands first. Men work from the middle of the bed toward the ends.

PORLAND CEMENT ASSOCIATION

A national organization to improve and extend the uses of concrete

are to relieve the vacuum effect created during detensioning and permit the concrete to pull away from the forms. When necessary, air under pressure can be put through the lines to free the precast member from the forms.

Controlled heat

Designed by Gordon Murphy, construction engineer of Milwaukee, the heating system for the beds is one of the most modern in the country. Steam for the girder beds is supplied by a Superior 125-hp steam generator located in a block building on the site. The steam is carried by underground lines to an exposed pipe running along each bed. At intervals along the pipe are petcocks through which the steam passes. A double layer of canvas cov-

ers the forms during curing.

Hot-water heat is supplied to the double-tee bed. The steam generator heats the water through a heat exchanger.

The heating and cooling cycles for both beds are automatically controlled and recorded from an instrument panel in the boiler house. In each girder bed there are three temperature-control points. Thermostatic elements at these points signal the three steam valves when to turn on and off. The signaling system is tied in with the main control panel, which prescribes the exact sequence of temperature rise when curing starts and the fall when curing is completed.

As curing starts, for example, the temperature can rise no faster than 40 degrees in the first hour and 20 degrees per hour thereafter until the temperature levels off at 155 degrees. After the concrete has reached a strength of 4,500 psi, the temperature is dropped 20 degrees per hour until it is within 20 degrees of the outside temperature.

Straddle rigs handle girders

Two 12-ton Travelifts work together to handle both the completed girders and the forms. The rigs easily carry the largest girders produced by the plant—girders 75 feet long, 3 feet deep, weighing 13 tons.

The hydraulically powered and controlled carriers are also convenient for picking up the long steel forms. To speed the work, the Form-Crete panels are kept bolted together for the length of the girder. The forms are handled in sections up to 75 feet long.

The 75-foot girders, as well as the smaller ones, are carried two at a time to a bridge site by a pole trailer. The two girders are banded together with straps that bear on steel angles at the corners. Wood blocks are sandwiched between the girders.

Stringing and stressing

A movable winch, powered by an electric motor, draws up to six strands at a time onto the beds. The 7/16-inch strands are stressed one at a time by a G. T. Bynum 10-ton hydraulic jack. Each strand is elongated about 30 inches to a total stress of 18,900 pounds.

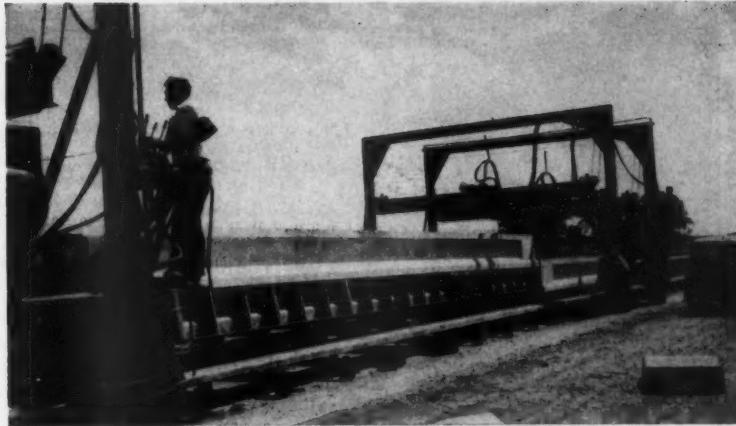
Prior to stressing, the draped strands are set in hold-up posts at the ends of the girders, and hold-down devices are connected to the 1/2-inch plate in the concrete bed. They are released after the draped strands have been cut and before the horizontal strands have been cut.

Reinforcing

The reinforcing steel is welded together in sections prior to being set in place. The larger girders require four flat sections of the steel—two on each side of the girder. These sections are wired to each other and to the strands to keep them in place.

With the affiliated company's ready-mix plant set up just across the highway, getting the concrete for the girders is no problem. Challenge and Rex 7-yard mixers, mounted on Ford

(Continued on next page)



Two 12-ton Travelifts move a 75-foot, 13-ton girder to a storage area adjoining the beds. One man on each machine regulates the hydraulic controls of the equipment.

CM HOISTS

...choice of the wise buyer who compares

CM HOISTS AND PULLERS are ruggedly constructed to give you years of trouble-free service. Yet they are unusually light...easy to handle because they are constructed of the strongest alloys of steel and aluminum. Equipped with famous CM-Alloy flexible, welded alloy steel load chain.

- **CM CYCLONE**
- Capacities from $\frac{1}{4}$ to 10 ton.
- 1-ton model weighs only 36 pounds.
- 96% efficient—easy to operate.
- Lifetime lubricated.



- **CM PULLER**
- Capacities $\frac{1}{4}$, $1\frac{1}{2}$, 3 and 6 ton.
- 6-ton model weighs only 13 lbs.
- Compact: stores in tool box.
- Lifts or pulls at any angle.
- Lifetime lubricated.

Write for catalog and name of your nearest CM dealer.

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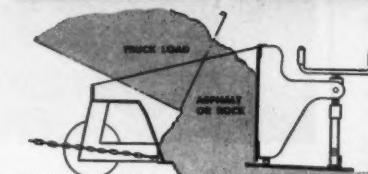
NOVEMBER, 1959

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-you'll be hours and dollars ahead
ROLA PAVER



HERE'S WHY

- Accurate depth control—from $\frac{1}{4}$ " up!
- Produces up to 25% compaction—cuts rolling time!

- Eliminates wheel and shoe marks, practically no raking required!

- Fast—standard Rola-Paver spreads up to 500 tons per day!
- Versatile—handles street and highway paving, patch work, driveways, parking lots, shoulders, trenches (with attachment)!
- Low investment, negligible maintenance cost!
- 3 basic models—9'6" Base Paver, 8'6" or 9'3" standard Rola-Paver, and new 8' light weight (950 lb.) model.

FAST BASE SPREADING, TOO!

Spreads base materials in up to 8" depths with exceptionally accurate control, at rates up to 200 tons per hour (crusher-run base).

GET THE FACTS, NOW! Write today for free literature, specifications, prices—please address Dept. T-11.

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AND FINISHING MATERIALS...

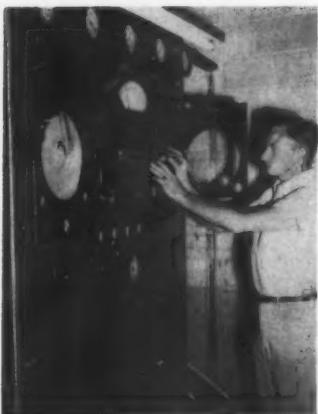
DEALER
INVITED

H. S. WATSON COMPANY

1316-67th STREET • EMERYVILLE, CALIFORNIA
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Power Buggies • Telescoping and Economy Vibratory Screeds • Rola Pavers and Trench Boxes • Wood and Steel Tilt-Up Hardware • Bulk Floats • Hoppers • Elephant Trunks and Chutes • Tamers • Hand Carts

For more facts, use Request Card at page 18 and circle No. 304



Elaborate instruments in the boiler house control and record temperatures in the girder and double-tee beds. Steam is piped to the girder beds; water heated by a heat exchanger goes to the double-tee bed.



Strength of test cylinders is measured by this Forney jack. Concrete is steam-cured until it reaches 4,500 psi.

(Continued from preceding page)

or GMC trucks, roll in alongside the forms.

The first 18-inch lift is thoroughly vibrated with four Wyco 1-inch vibrators that are plugged in to an electrical outlet at one end of the bed. On this lift, the men make three passes with the vibrators. On the top lift, they make only one pass.

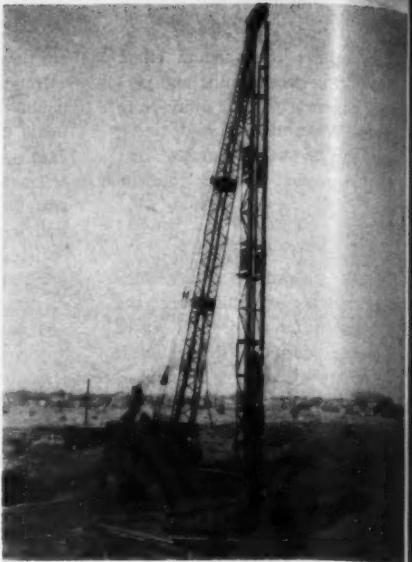
A special device, invented by plant superintendent Charles Cozad, is used to place concrete for the middle row of girders. Basically, it's a belt conveyor that transfers the concrete from the transit mixer to the forms. The 4-wheel unit is pulled by the mixer. Concrete is chuted to the 24-inch belt, which carries the mix up an incline and then drops it through a short funnel to the forms. The belt is powered by a 3-hp electric motor.

Cutting strands

When the girders have gained a specified strength, the strands are cut. They are cut in a sequence to give the least possible horizontal movement to the girders. Strands are burned off two at a time by two men working together. They first cut the draped strands, starting from the middle of the row and working toward the ends. Then they cut the straight strands, two at a time, in a similar sequence.

Normally, the production crew of 13 men turns out one line of girders, or 300 feet, each day, and completes 220 feet of double tees. THE END

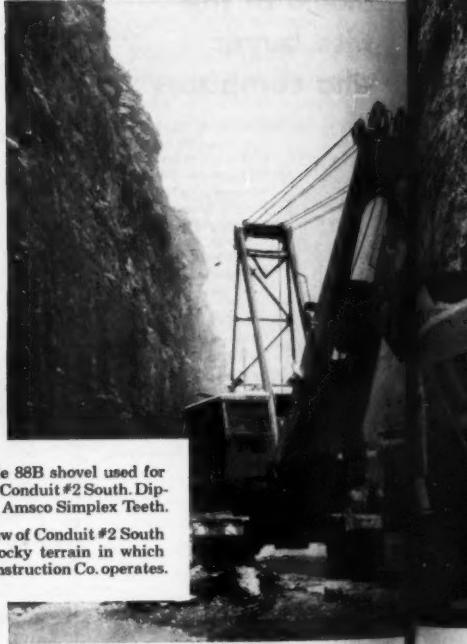
ON A STRETCH of the Long Island Expressway in Queens, New York City, a Bucyrus-Erie 42-B crane, equipped with 70-foot boom and 60-foot leads, drives 12-inch H-pile soldier beams with a Vulcan No. 1 steam hammer. Soldier beams are 30 feet long and are spaced on 8-foot centers for the 7-foot-wide sanitary-sewer trench. Klevens Corp., Yonkers, N. Y., is the contractor on this section.



How AMSCO helps you MOVE



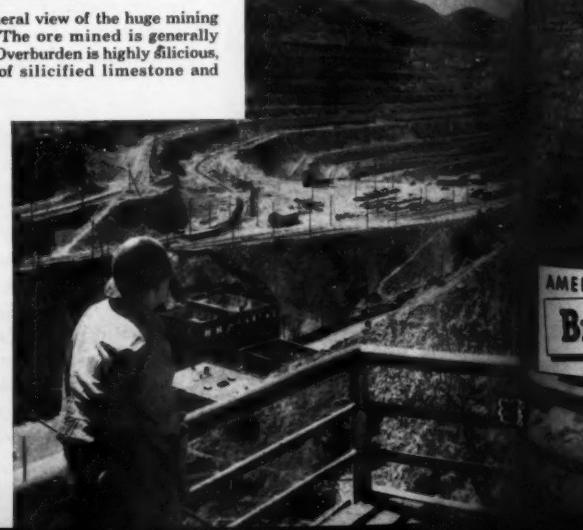
Left: Bucyrus Erie 88B shovel used for rock excavation at Conduit #2 South. Dipper equipped with Amsco Simplex Teeth.



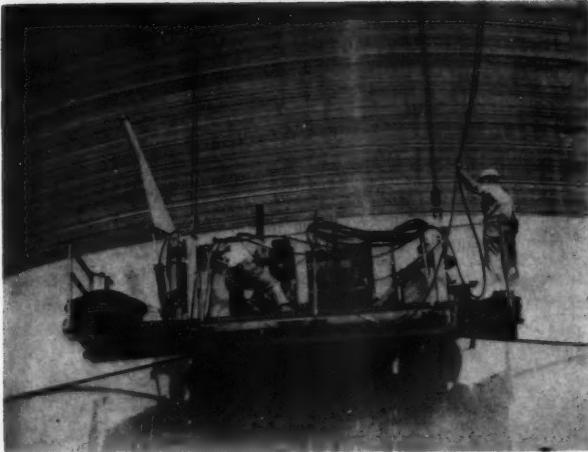
Right: General view of Conduit #2 South project showing rocky terrain in which Gull & Defelice Construction Co. operates.



Left: Amsco Dipper on Marion 5-yard shovel, loading cars at mine. In loading ore, these dippers average 6,300 tons per 8-hour shift... 5,000 tons per shift in working waste material.



Right: General view of the huge mining operation. The ore mined is generally porphyry. Overburden is highly silicious, composed of silicified limestone and quartzite.



A self-propelled carriage is lowered outside a prestressed-concrete standpipe being built in Sayreville, N. J. The carriage holds two workmen and a Preload wire-winding machine, which wraps high-tensile wire around the wall.

Town builds 2.95-million-gallon prestressed standpipe

■ Sayreville, N. J., has recently completed a 2.95-million-gallon prestressed-concrete standpipe as part of a \$1,200,000 water expansion program. The cylindrical 122×65-foot tank was built by the slip-form method, and forms for the dome were carried up with the wall forms. The forms, approximately 4 feet high, were elevated an inch at a time as concrete hardened.

The standpipe was prestressed by

wrapping the wall and the edge of the dome with high-tensile wire, which was stretched or drawn as it was applied by a Preload wire-winding machine. The machine was suspended along the side of the tank from a carriage that rode the outer edge of the dome. The carriage was anchored to the center of the dome by radial cables, and the entire mechanism was self-propelled.

The 24 arched trusses for the dome radiated outward from the center of the structure to the slip forms. Twenty of the trusses were of the bowstring type with tie rods at the base, and the remaining four were regular trusses of wood-strut construction. The four wood-strut trusses were arranged to form four 90-degree quadrants, and five bowstring trusses were equispaced within each quadrant.

The tie rods of the bowstring trusses terminated in a 36-inch-diameter steel plate at the center of the structure. Arches terminated at the center at wood hypotenuses of the 90-degree angles made by the four main trusses. The bowstrings were bolted to the arches at the slip-form ends. The trusses rested on the walls of the wall forms, the dome sheathing being sufficient to keep them erect. The dome is prestressed to withstand lateral dead and live loads of the dome itself.

The master plan for the water expansion program was developed by Charles J. Kupper, consulting engineer, New Market, N. J. The standpipe was designed and constructed by The Preload Co., Inc., New York City.

Ryerson division offers post-tensioning service

■ The prestressing of concrete by the post-tensioning method is now a part of the service provided by the reinforcing division of Joseph T. Ryerson & Son, Inc., Chicago. Facilities have been established at the company's Chicago and Los Angeles plants for supplying post-tensioning assemblies, or tendons, for shipment to job sites throughout the nation.

Consulting group formed for prestressed concrete

■ Rockwin Prestressed Concrete Corp., Santa Fe Springs, Calif., has formed an engineering consulting group, Rockwin Engineers, specializing in prestressed concrete. Services available only to architects and engineers include design, checking, investigations, inspections, reports, and construction supervision in connection with bridges, buildings, water-front structures, stadiums, etc.

Steven Galewski, a pioneer in prestressed concrete in this country, heads Rockwin Engineers.

For more facts, circle No. 305

MOVE MORE TONS PER DOLLAR

*Read these user reports on how
AMSCO Dippers and Teeth perform
in rugged digging service*

40,000 YARDS OF ROCK HANDLED BEFORE AMSCO 2-PART TEETH NEED REPLACING

Gull & Defelice Construction Co. is working on Section 3 of the powerhouse conduit project — excavating 140 feet deep, almost entirely in rock. All five power shovel dippers on the job are now equipped with Amsco Simplex 2-Part Reversible Teeth.

These dippers work 16 hours a day, 6 days a week for 2 weeks — handle approxi-

mately 40,000 yards of rock — before tooth replacement is required.

Says Mike Cazzolla, Equipment Superintendent, in talking about the Amsco teeth: "They're built rugged and take a lot of punishment from the rock. We get longer wear out of them because we can turn them over." He's referring, of course, to the reversible tip feature.

John Cazzolla, Master Mechanic, adds the important fact that *they can replace these teeth in ten minutes with no trouble*. This feature, together with the longer wear, means important savings in downtime.

steel dippers — built for toughness, high abrasion resistance and long service life.

For rugged digging anywhere

... wherever high impact and abrasion are problems, you'll "move more tons per dollar" with Amsco Manganese Steel Dippers and Simplex 2-Part Reversible Teeth. See your power shovel equipment dealer for sizes and types available. Or write us direct for technical bulletins on Amsco Dippers and Simplex 2-Part Teeth.

THEY USE AMSCO DIPPERS ...FOR HIGH-SHOCK, HIGHLY ABRASIVE DIGGING

This huge copper mine operates the largest collection of big power shovels (5 yards and up) in the world. For this rugged service they use Amsco dippers to strip off extremely abrasive overburden ... handle waste material ... and load copper ore. These are cast manganese

ON THE
NIAGARA
POWER
PROJECT

AT ONE
OF WORLD'S
LARGEST
COPPER
MINES

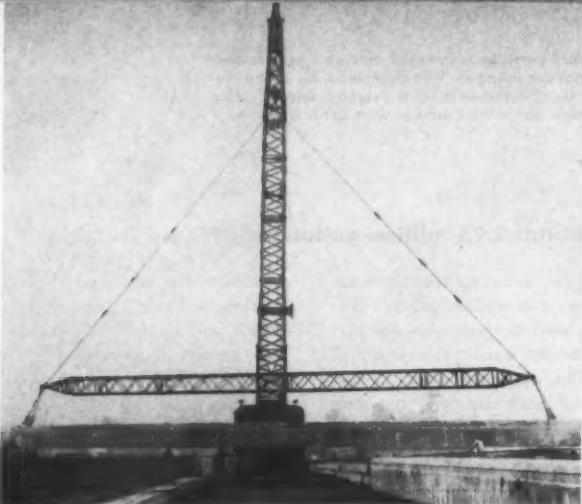
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American Manganese Steel Division • Chicago Heights, Ill.

Other Plants In: Denver • Los Angeles • New Castle, Dela. • Oakland, California • St. Louis

In Canada: Joliette Steel and Manitoba Steel Foundry Divisions



A variety of box beams is turned out with a small number of specially designed forms, by Dickerson Structural Concrete Corp. at Youngwood, Pa. The Manitowoc 3000 is using a spreader beam—of tubular pin-connected boom sections from a truck crane—to pick up a girder more than 50 feet long.



**Prestressing outfit
works to establish ...**

**ONLY
RAMSET**

**has the exclusive
RED TIP fastener**

WOOD TO CONCRETE



STEEL TO CONCRETE



WOOD TO STEEL



STEEL TO STEEL



INTO STEEL



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Red Tip serves as
guide in barrel of
tool, and indicates
proper penetration.



In addition to powder-activated fastening, the versatile Ramset System includes Shure-Set hammer-in tools for light fastening, and Ringblaster® heavy-duty kiln gun.

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WINCHESTER-WESTERN DIV. • OLIN MATHIESON CHEMICAL CORPORATION
283-A WINCHESTER AVENUE • NEW HAVEN 4, CONNECTICUT

For more facts, use Request Card at page 18 and circle No. 306

A steady market for box girders

An established but relatively young prestressed-concrete firm, Dickerson Structural Concrete Corp., Youngwood, Pa., is building its success on an awareness of new developments in prestressing and an active part in expanding the prestressed market.

This organization, together with other prestressed-concrete producers in Pennsylvania, has been working closely with the department of highways to establish standard specifications and components for use in bridge construction. This, of course, is designed to promote a greater use of prestressed members.

Universal beds

Dickerson has been using two universal beds to turn out all the various types of prestressed components. They are on a casting bed 500 feet

long and 15 feet 6 inches wide, and have effective lengths of 440 feet.

The casting bed consists of a 6-inch-thick slab supported by 3-foot-deep frost walls along the outside edges and a stiffener running down the center. The abutment at each end is 15½ feet wide, 44 feet long, and 10 feet thick.

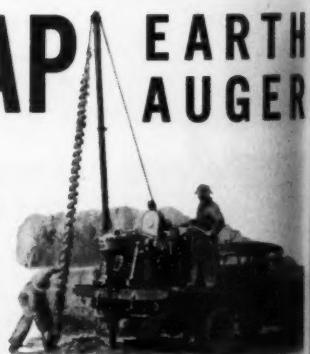
Sheet piling was driven to bedrock across the abutment-toe width to position the overturning fulcrum of each abutment as well as increase resistance to sliding. Each of the abutments was designed for a total capacity of 1,200 tons, or 600 tons per universal bed.

Each abutment has eight 24 W.P. 145 anchor columns—four to each bed—with ½-inch box-plate stiffeners so that the anchor columns could be filled with concrete.

ACKER AP EARTH AUGER

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versatile soil
sampling rig

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- Penetration Tests
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- Diamond Bit and Shot Core Sampling
- Developing Rock Profiles
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Whatever your soil sampling requirements may be, chances are, that this inexpensive, portable earth auger will do it better! You'll be surprised at the capacity and price of this incomparable rig!

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Over 40 years of experience manufacturing a complete line of diamond and shot core drills, accessories and equipment.
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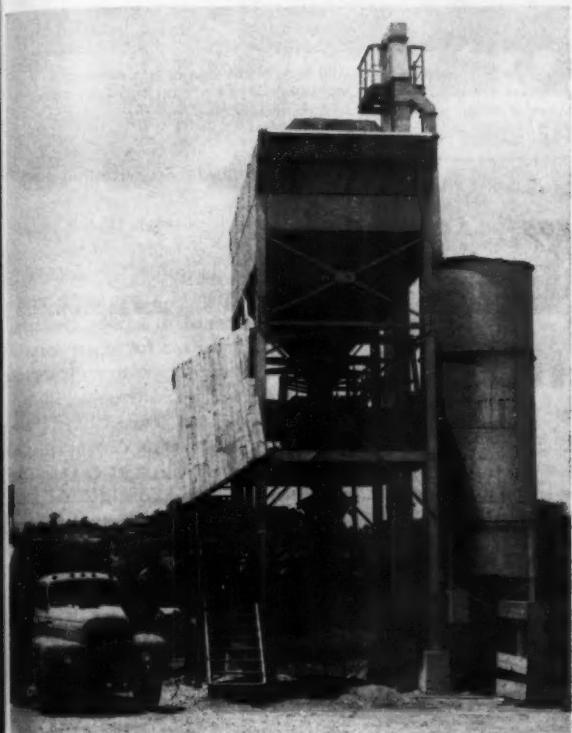
CONTRACTORS AND ENGINEERS

The company has been producing 3 and 4-foot box beams on the casting bed, which can be easily adapted for beam production. Up to now, however, most of the production has been devoted to box girders because all alternate bridge designs submitted for highway structures specified the use of this type of span. The company feels that box girders, rather than prestressed I-beams, offer more competition to the standard steel spans. According to Dickerson officials, the box-girder construction within the

state has been found to compete favorably with steel-span work. The bridges built up to now have had box girders laid side by side across the span so that deck forms were not needed for the bridge slab. Any deck surface is easily placed directly over the box girders.

The company also feels that the box girder is even more competitive than the draped-strand girder recently developed. It believes that the production cost for draped-strand

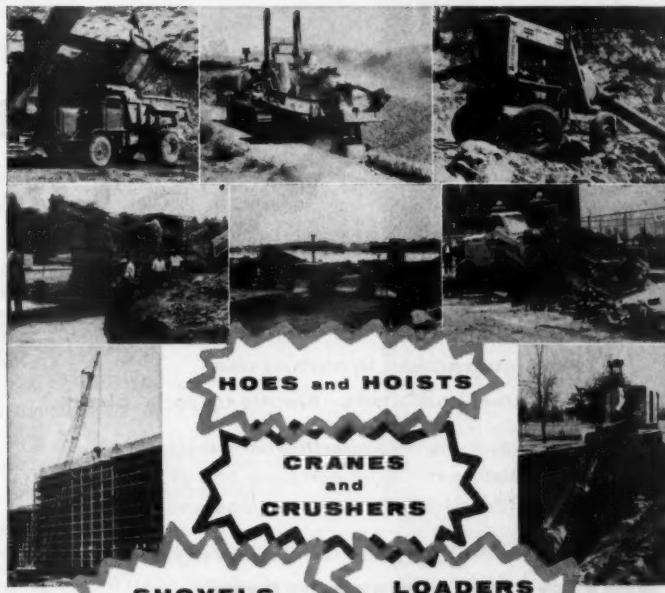
(Continued on next page)



Concrete for all operations is supplied by the prestressing yard's Hiltzel portable batch plant. It consists of a 600-barrel cement silo and 4-compartment aggregate bin, which includes a cement compartment. The Rex mixer on the International truck is used to deliver concrete to the yard once for placement.



At the jacking end of the universal bed, the jacking frame supports two Rodgers 100-ton hydraulic jacks. The strand template is at left. Anchor columns embedded in the concrete abutment consist of 24 WF 145-pound sections.

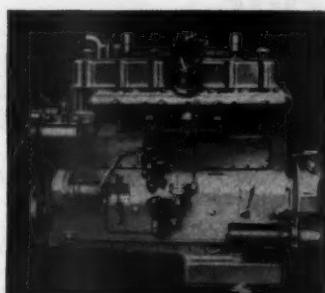


CONSTRUCTION MACHINERY OF ALL KINDS

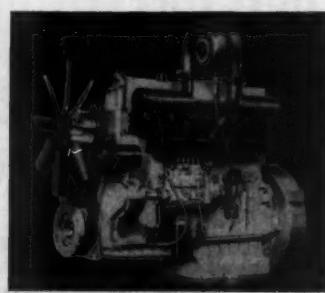
WAUKESHA powers 'em all

50-1235 hp DIESEL, GASOLINE, LPG

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Waukesha gasoline engine—145-GZB— $5\frac{1}{2}$ " x 6", 817 cu. in., 240 max. hp. Other models, 50 to 980 hp; bare engine or complete power units.



Waukesha Diesel—WAKDBS (turbocharged) $6\frac{1}{4}$ " x $6\frac{1}{2}$ ", 1197 cu. in., 400 max. hp. Other models, 50 to 1235 hp; bare engine or complete power units; normal or turbocharged.

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NEW YORK TULSA LOS ANGELES
Factories—Waukesha, Wisconsin, and Clinton, Iowa

452

For more facts, use Request Card at page 18 and circle No. 309



This compact Jaeger Model 2PN, pumps all the water a 2" suction hose can handle. With 2½" suction hose it pumps more than 14,000 gph.

Now handle more water with Jaeger pumps

Today's Jaeger Sure Prime pumps deliver performance never before offered—and at slower, long-life operating speeds. For example, a Jaeger 6PH can handle 100,000 gph as a dewatering pump or deliver 975 gpm at 60 psi pressure for well point jetting or gravel washing. Base your pump buying on latest information. See your Jaeger distributor or send for catalog.

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NOVEMBER, 1959



Workmen set a cardboard void into the Plant City Steel forms for a box girder. Reinforcing is inserted over the void before remaining concrete is placed. Note turnbuckles for alignment and stripping.



After concrete has been finished, the tops of the beams are covered with burlap. Hoses are used to spray hot water on the burlap and keep about two inches of water puddled on top of the concrete.

(Continued from preceding page)

Positive Protection for Lives... Loads Genuine Lebus Load Binders



- 100% drop forged—heat treated
- Strength to break high test chain
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Travelift

TRAVELIFT & ENGINEERING, INC.

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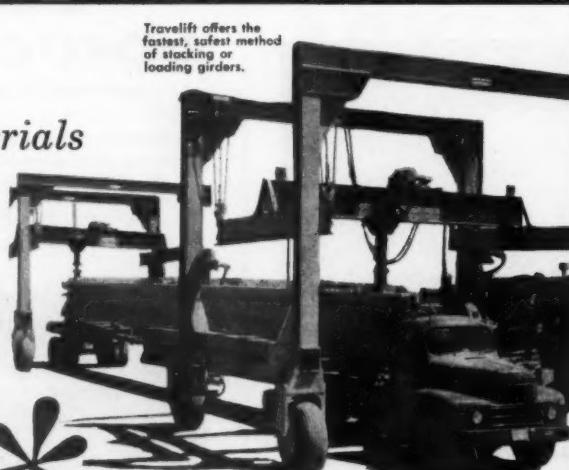
Please send information on the SELF-PROPELLED TRAVELIFT

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This free-traveling vertical lift carrier steps up the entire pace of your operations. Use Travelift to pull strand, set forms, pour forms, clear beds, store finished beams. *Four small levers control entire operation!* Steering, lifting and propulsion of the Self-Propelled Travelift are by hydraulics. Available in 6 models with Capacities of 7, 12 and 25 tons or can be custom built to meet your requirements.

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girders is so high that it would be better to use a different box design in certain instances. For example, the end section of a box girder could be strengthened to handle greater pre-stress moments for longer spans.

Another advantage for box girders according to Dickerson, is that Pennsylvania prestressed producers have to submit alternate designs that are competitive with steel-designed spans and the box girder fills the bill. It meets the depth of the steel-girder sections without decreasing minimum vertical clearances under bridges. If prestressed I-beams were used in an alternate design, the deeper sections would require existing bridge abutments and piers to be revamped in order to meet minimum clearances.

Plant operation

Dickerson has 880 linear feet of specially designed steel forms, built by Plant City Steel Corp., Plant City, Fla., to pour 17, 21, 27, and 33-inch-high and 36 or 48-inch-wide box beams. For beams having heights of 42 or 45 inches, 12-inch risers are bolted to the top flange of the 33-inch form. These risers can also be used to pour 12-inch beams. All this gives Dickerson great flexibility with a small number of form sections. The vertical forms are equipped with adjustable shear-key inserts to handle the various beam heights.

Alignment of the side forms is obtained at the top by using turnbuckles and at the bottom by positioning spacers between the forms and a steel angle guide. This angle guide is per-



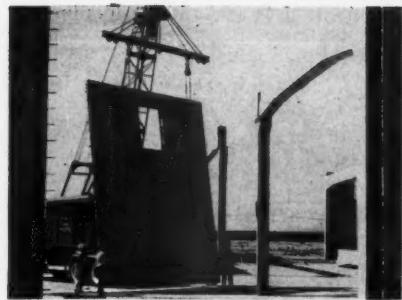
During the tensioning operation, the jacking frame is pushed back, and this pulls the four 3½-inch steel rods that pull the strand template and elongate the strands.

CONTRACTORS AND ENGINEERS

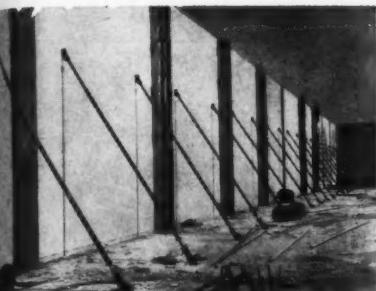


WAREHOUSE

DANIEL CONSTRUCTION CO. PHOTO



SUPERIOR Stress Equalizers, Pick-Up Inserts, and Lifting Angles were used on this panel.



ADJUSTABLE BRACES used for quick and easy alignment of panels

SUPERIOR Has the Accessories AND the System for TILT-UPS...

**FROM ORIGINAL LAYOUTS
TO FINAL POSITIONING**

In addition to tilt-up accessories which have been used and proven on thousands of conventional as well as unusual projects in this field, SUPERIOR also provides the *system* for the entire job, from original planning and layouts, to the final positioning of the precast panels.

As the pioneer in this field, SUPERIOR has recently developed a special Stress Equalizer for reducing lifting stress in tilt-up panels of over 20 ft. high. It offers two advantages: (1) Less concrete reinforcing steel is required for stresses which occur at time of lift; (2) Permits use of simplified crane rigging.

On your next tilt-up job, avoid expensive crane delays, be assured of safety, and reduce overall costs! Specify the SUPERIOR System.

For details request a copy of Bulletin TU-3.

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CONCRETE ACCESSORIES, INC.**

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For more facts, use Request Card at page 18 and circle No. 312



"Jet age" contractor completes 3700-ft. runway extension time

GULF MAKES THINGS RUN

Racing against time and plagued by heavy summer rains, A. Tomasso, Inc. of New Britain, Connecticut, became one of the earliest contractors to feel the competitive impact of the commercial jet age.

Tomasso won the contract to extend the main runway at Hartford's Bradley Field, where the old 6000-ft. runway was too short for commercial and military jet aircraft. The contract called for earth-moving, compacting, base-laying and paving . . . for a 2700-ft. primary extension of the runway, plus a 1000-ft. over-run for emergencies. Earth-moving added up to more than 1,000,000 cubic yards. Last July, in spite of unusually wet weather in the summers of 1958 and 1959, they finished on time

—plenty of proof that Gulf makes things run better. Gulf Clean-burning Gulf diesel fuel powered all the equipment heavy equipment, including three new Euclid T-60 scrapers, two Allis-Chalmers 21 bulldozers, a D-8 motor grader, D-9 "Cat," and a "Cat" 12 grader. Louis D. Gronow, Gulf Master Mechanic for A. Tomasso, Inc., reports: "Unusual maintenance problems were reduced by the clean-burning qualities of Gulf diesel fuel. Our equipment kept working—around the clock—with very few mechanical delays, and the engines stayed unusually clean."

And Angelo Tomasso, President, says: "We've never in our history had to pay a penny in damages for being behind schedule. We're not going to start now."



xtension time, in spite of excessive rain . . .

GRUN BETTER!

things run better if Gulf supply the fuels and lubricants for your powered all the equipment, and you'll see how Gulf makes things run new Euclid Tractor. Just call the Gulf Sales Engineer at zeros, a D-8 or nearest Gulf office, or write for 88-page this D. Groover, "Gulf Contractors' Guide," the maintenance c., reports: "Normal for heavy equipment.

by the clean-burn equipment is GULF OIL CORPORATION
few mechanics at DM, Gulf Bldg., Pittsburgh 30, Pa.

GULF

ays: "We've never had any damage for begin, Connecticut, checks heavy equipment maintenance in "Gulf start now." "Contractors' Guide" with Lee Douglas, Gulf Sales Engineer.



Mr. Construction Manufacturer



At the A.E.D. convention in Chicago in January?

You should. He's one of the thousands of important equipment dealers who will attend. The *A.E.D. Convention Daily* published by CONTRACTORS AND ENGINEERS presents the opportunity for the large and small manufacturers to contact every distributor attending. At the breakfast table, in competitors' suites, literally as he gets out of bed in the morning. Approaching the fourth year of publication, the Daily is read for up-to-the-minute information and reports on each day's events. Your advertising helps assure more visits from distributors at your condex booth or suite. And isn't that why you are going to Chicago?

See him.

Advertise in the **AED Daily**



Neoprene-coated tarps, suspended on tubular frames, cover the entire casting bed while low-pressure steam works underneath to cure the girders. Steam is slowly raised to 120 degrees F for a minimum of 36 hours.



Jacks, replaced in the jacking frame, are used to detension the completed girders. They slowly transfer the prestress force from the end abutments into the beams in a 20-minute operation.

manently attached to the casting bed. Eight 7-wire prestressing strands, supplied by Leschen, Roebling, or American Steel & Wire, are pulled from an 8-reel rack at the dead end of the bed. A Michigan 75A front-end loader is used to pull 8 wires simultaneously and repeats the operation until all the strands are pulled. The strands are threaded through steel templates located at each end of the bed, and are cut at the dead-end template. Supreme strand vises are used to fasten the strands to the templates. Correct positioning of the wires in each beam along the bed is insured by vertical steel spacers.

Initial stress

Each individual strand is first tensioned with a force of 2,000 pounds, which is measured by a dynamometer. The load is placed by an air ram. Following this initial tensioning, the entire strand pattern is stressed as strand templates are pulled. This is done by two or three 200-ton Rodgers hydraulic jacks positioned between the anchor columns and the jacking frame at the jacking end of the bed. The jacks are regulated by an electric hydraulic 4-stage pump, which is located in a pump house behind the jacking end of the bed.

The jacking frame is attached to the strand template by four 3½-inch-diameter high-tensile steel rods. Each ½-inch strand is tensioned to 14,000 pounds. This is measured by elongation and checked by hydraulic gages. For a bed length of 440 feet, the elongation for ½-inch Roebling strands is 30 5/16 inches after initial tensioning. Slip nuts are used around the four 3½-inch rods to hold tension and to allow the jacks to be released. After pretensioning, adjustable steel bulkheads are positioned along the bed according to the required length and skew of the beams. The bulkheads can be varied in width, to accommodate end skews on box girders, by using plywood fillers.

Concrete batch plant

Dickerson has a Hiltzelt batch plant, consisting of a 600-barrel cement silo and a 4-compartment aggregate bin. The bin, having one compartment for cement storage, is capable of producing 35 cubic yards of concrete—*(Continued on next page)*

PRECAST SLABS HANDLE EASIERwith Dayton Sure Grip Accessories

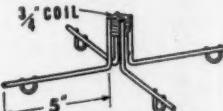
Safer, More Economically Too!

No doubt about it, when precast slab accessories are engineered specifically for a given job, they'll do the job easier, safer and more economically. The Dayton Sure Grip accessories shown here are standard items. They may be right for your job, but if not, our engineering and drafting departments will design the product that fills your specific needs or specifications.

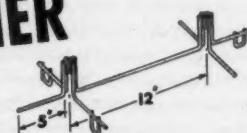
You can avoid lost time and damaged

slabs when you use the services of Dayton Sure Grip and Shore Co.

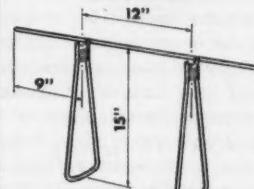
These accessories are made in a full range of sizes, accommodating up to 1½-inch coil bolts.



Type 1 SINGLE PICK UP INSERT
Safe loads up to 9000 lbs.
P.S.I. with 1½-inch bolts



Type 2 DOUBLE PICK UP INSERT
Safe loads up to 12000 lbs.
with 1-inch bolts



Type 3 DOUBLE LOOP INSERT
Safe working loads in shear
up to 6000 lbs. with 1-inch
bolts



THE DAYTON SURE-GRIP & SHORE CO.
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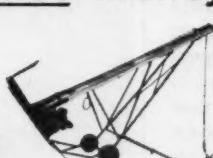
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Dayton Sure Grip has a complete line of precast accessories including slotted studs, lifting anchors, slab braces, screw anchors and bolts. Write for our FREE catalog and the name of your nearest Sure Grip dealer.

This material hoist makes money for you!



FLIP...



Sasgen SELF-ERECTING LIFTAMATIC HOIST

...IT'S BRACED,
READY
FOR WORK!

GOES UP IN 2½ MINUTES—A ONE-MAN JOB!

This is the hoist that goes where you go, does what you want it to do—safely and dependably, built for heavy-duty service. Can be disassembled and shipped anywhere by common carrier.

Aluminum rails telescope, provide unloading heights from 13 to 40 feet. Has 7½ hp. gasoline engine and centrifugal-type governing downbrake (1000 lb. capacity) having 125 fpm. line speed. Remote control and adjustable limit stops standard. Side-loading platform is 34 x 60 inches to handle most loads. Also with reversible electric motor (500 lb. capacity). Write now for details—production is limited.



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MANUFACTURERS OF EQUIPMENT FOR THE CONSTRUCTION INDUSTRY

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CHICAGO 22, ILLINOIS

For more facts, use Request Card at page 18 and circle No. 315

(Continued from preceding page)

using a 7½-bag mix—before it has to be recharged by the Manitowoc yard crane. Concrete is mixed and transported to the casting bed by a Rex 7-yard truck-mixer; this charges a 1-yard bucket that places the concrete.

The bottom slab of the box beam is poured first and provides support for the cardboard box voids that create a void inside the beam. Then steel reinforcement cages are inserted, and concreting is continued until the desired beam height is reached. A specimen of concrete used in each beam is taken, for a slump test, an air-constant test, and four 6-inch-diameter 12-inch test cylinders.

Beams cured

After the concrete is finished, the tops of the beams are covered with two layers of burlap. A garden-type soaker hose is then placed over the burlap until about 2 inches of hot water puddles over the concrete inside the forms. The entire casting bed is then covered with neoprene-coated tarpaulins, supported by tubular frames. Low-pressure steam from an Ames 100-hp steam boiler is injected under this shelter from lines extending the entire length of the casting bed. This is done approximately four hours after concrete is placed. The temperature of the steam is slowly raised, at a rate of about a degree a minute, to 120 degrees F. This is maintained for a minimum of 36 hours.

At the end of the curing period, two of the test cylinders cured with each beam are taken to the plant laboratory for compressive-strength tests. If the cylinders indicate a strength of 4,000 psi in the beams, the bed is detensioned and the pretensioning force transferred into the beams.

Detensioning beams

The detensioning is accomplished in much the same way as the tensioning process. The jacks are replaced in the jacking frame to slowly transfer the prestress force from the anchor columns onto the beams. This operation takes about 20 minutes. Except for cases of extreme overloading, the beams now experience the greatest fiber stress they will be required to withstand at any time during their lives. They are, in effect, a plant-tested product.

After the detensioning process, the strands between the beam bulkheads are cut by a torch and the beams lifted off the bed by the Manitowoc 50-ton crane. For beams longer than 50 feet, the crane uses a spreader beam consisting of tubular pin-connected boom sections normally used on a Lorain truck crane.

The beams are stored in the yard until the design strength of the concrete is reached. With the concrete mix currently being used, strengths of at least 6,000 psi are reached in 5 days, which is well over the design strength of 5,000 psi in 28 days. While beams are in the storage yard, the ends of the prestressing strands are protected with a coat of heavy bituminous paint for protection.

After erection of a box-beam bridge

span, the shear keys between the beams are filled with a cement grout and the beams transversely bolted together. This makes the deck act as a unit under loading rather than as a series of individual beams. After the curb is cast in place, the bituminous or concrete wearing surface is applied.

Personnel

W. Logan Dickerson is the president; Charles Burns, the plant engineer; Frank Barker, the plant superintendent; and Earle Butts, the sales engineer for Dickerson Structural Concrete.

THE END



DESIGNING WITH

Steel Save



...and the superstructure went up in just weeks



HOW WELL CAN STEEL BRIDGES DO IN COMPETITION WITH OTHER MATERIALS

Just take a look at these facts and figures:

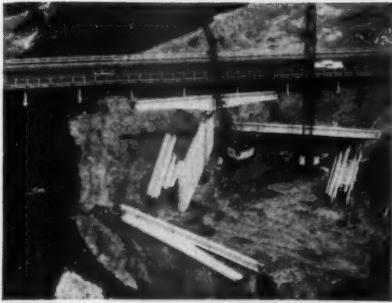
NOVEMBER 21, 1958—Pennsylvania Department of Highways accepted bids on a 350-ft-long, 4-lane dual highway bridge over Brodhead Creek between the boroughs of Stroudsburg and East Stroudsburg. The Department of Highways designed the bridge around the use of a competitive material with an alternate for structural steel designs by the contractors, subject to approval by the Department of Highways.

Contract awarded to J. Richard Nissley, Inc., whose bid is based on a superstructure bid of \$300,000 for structural steel design by Bethlehem Steel. The only bid based on design using competitive material was \$402,000 for superstructure. Steel design saved \$102,000!

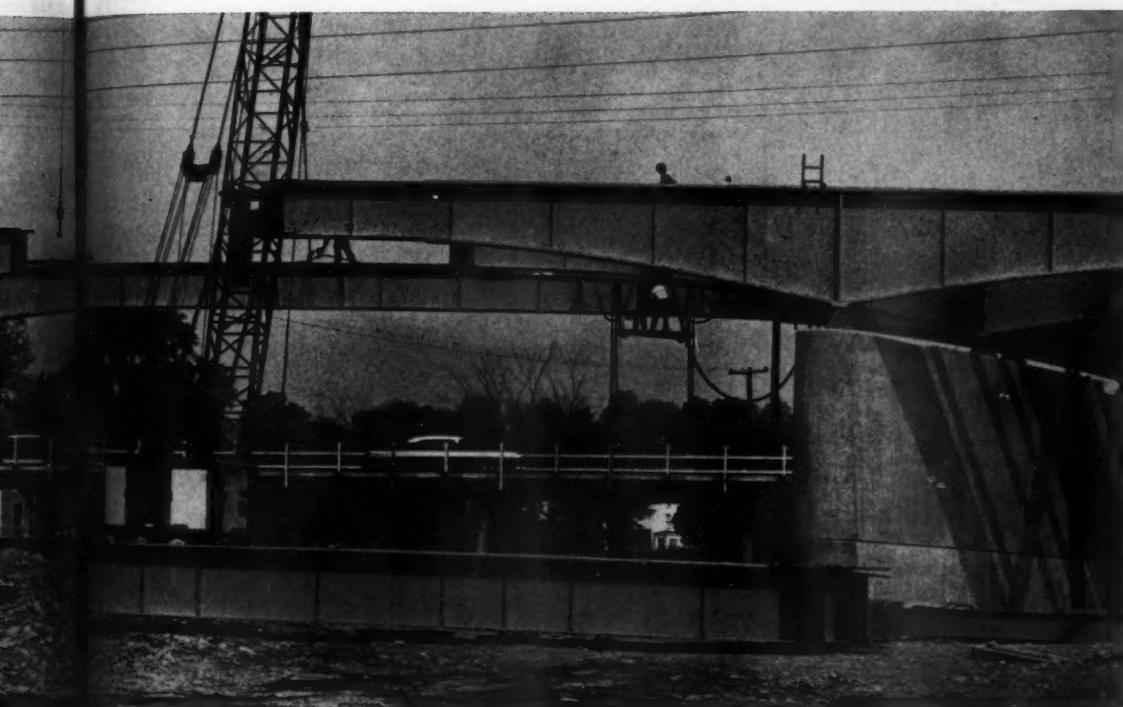


EXACTLY 106 YEARS TO THE HOUR that Peter Cooper spread the cornerstone mortar for the first building of The Cooper Union, New York City, a similar ceremony took place. This time it was for the free educational institution's new \$4.5 million School of Engineering. Present at the 1959 cornerstone ceremony are, left to right, Arthur A. Houghton, Jr., Cooper Union trustee and chairman of the Centennial Committee; Miss Elizabeth J. Carbon, secretary of the Union; Mayor Robert F. Wagner; former President Herbert Hoover; Charles A. Selby, president of Vermilye-Brown Co., Inc., New York City, general contractor; and Benjamin L. Smith, partner of Voorhees, Walker, Smith, Smith & Haines, New York City, the architects. Selby and Smith hold silver trowels used to seal a box of mementos and records in the cornerstone.

over 102,000



The first steel was placed on June 3.



in just working days!

DO IN MATERIALS APRIL 4, 1959—Fabricating operations began at Bethlehem's Pottstown Works.

JUNE 1, 1959—First steel members shipped to the bridge site.

JUNE 3, 1959—Steel erection began.

JUNE 10, 1959—Closing members placed in 6 days!

JUNE 12, 1959—High-strength bolting operations completed. Bethlehem crew loaded out; general contractor took over.

**FOR LOW COST, FOR FAST CONSTRUCTION,
ALWAYS SPECIFY STEEL BRIDGES**

BETHLEHEM STEEL

For more facts, use Request Card at page 18 and circle No. 316

NOVEMBER, 1959

Closing the Brodhead Creek bridge on June 10. The center girders measure 67 ft long and weigh 15 tons each. The main span is 150 ft; the two side spans 120 ft each. The girders are of welded construction, connected in the field with high-strength structural bolts. Total tonnage: 630 tons.



Asphalt Institute offers advanced design criteria

■ The Asphalt Institute has launched a program to enlist engineering support for important advances in asphalt pavement design and construction criteria, such as thicker asphalt sections, tighter compaction specifications, and better drainage of multiple highways.

In line with continuing efforts toward refinements in asphalt specifications, the institute has replaced the obsolete loss-on-heating test with the thin-film oven test, which reportedly provides a better indication of asphalt quality.

To meet the demands of present and future traffic on heavily traveled roads, the institute strongly recommends the inclusion of asphalt base in addition to a 4-inch minimum thickness of asphalt concrete in the surface and binder courses. Similarly, it points out that modern channelized heavy traffic calls for tighter compaction specifications; and that asphalt pavement course should be compacted with rollers that apply contact pressures equal to or greater than those applied by the traffic which will use the pavement.

Drainage should be full width, the institute claims, and adequate to prevent excessive moisture from accumulating beneath a broad expanse of pavement.

Data on photogrammetry covered in textbook

■ A comprehensive coverage of the principles of photogrammetry is contained in a textbook by Francis H. Moffitt. "Photogrammetry" develops such subjects as aerial cameras, geometry of the aerial photograph, factors in flight planning for aerial photography, ground control for photogrammetry, and the principles of radial-line plotting and planimetric mapping.

Also discussed are stereoscopy and parallax, geometry of overlapping vertical photographs, determination of the orientation of a photograph, rectification of tilted photographs, mosaics, stereoscopic plotting instruments, oblique photography, and terrestrial photogrammetry. Numerous illustrations, examples, and problems are provided.

Priced at \$12, the book may be purchased from the International Textbook Co., Scranton 15, Pa.



Using a 100-foot boom and 30-foot jib, a Link-Belt HC-108 truck crane sets a prestressed inverted-tee beam in place to span 24 feet between columns for the service building for the Denver public schools. Beams weigh about 4 tons each.

Cranes use long reach to set prestressed beams

Reaching their full 130-foot lengths, two 35-ton truck cranes joined forces to set the precast, prestressed roof sections for the new service building for the Denver public schools.

The general contractor for the structure was A. A. & E. B. Jones, Inc., Denver. The prestressed roof system was subcontracted by Rocky Mountain Pre-Stress, Inc. Skyline Crane Service supplied the two Link-Belt HC-108 motor cranes equipped with 100-foot booms and 30-foot jibs.

The 200×170-foot structure, which will serve as a warehouse and service facility for the Denver public schools, stands on a hillside location that gives it a full 2-story exposure on the east side but only a single-story exposure on the west.

Jones formed the walls, columns, and ceiling of the partly exposed first floor by means of the Acrow V-Form

system. The waffle-type ceiling slab utilized paper filler boxes, manufactured by Lawrence Paper Co., Lawrence, Kans., to create the voids on the V-Form deck. The second-floor columns were also formed with the Acrow V-Form system of external corner members and column clamps, together with plywood sides.

The roof system consists of precast, prestressed inverted-tee beams spanning the 24 feet between columns in one direction. These beams are 12 inches deep and 20 inches wide at the bottom, stepping into a 13-inch stem. They are reinforced with 12 Roebling ½-inch prestressing strands. The beams weigh about 4 tons each.

Double-tee roof units rest on the lower flanges of the inverted-tee beams and span the 26 feet between the beams to complete the roof deck. The tees are 5 feet 8½ inches wide and have 12-inch-deep webs. The

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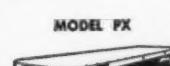


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CONTRACTORS AND ENGINEERS

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NOVEMBER,



Since cranes could not operate from the building floor, two Link-Belt cranes reach out their full 130 feet to place one of the 4-ton pre-stressed inverted-tee beams for the central part of the 170x200-foot building.



The Acrow V-Form system was used to form the second floor. Paper filler boxes, made by Lawrence Paper Co., Lawrence, Kans., have been partially stripped.

high about 3½ tons each.

Take long reach

Since the building floor was not designed for heavy loads, the cranes had to work from outside the building. The height of the first-floor exterior on the east side limited the crane to the setting of two bays of units from that side. The remainder of the roof had to be set on the west side, with the cranes working in almost 120 feet from the edge of the building.

On the very long reaches, the two cranes each took an end of the 4-in. inverted-tee beams to set them in place on the columns. When a bay of these beams had been set, the cranes did the same thing for the

slightly lighter double tees. As soon as the bays with the longest reach had been erected, one crane moved to another job and left the rest of the work to the remaining crane. The entire 34,000-square-foot roof was erected in two days.

The roof was finished with insulation and built-up roofing. The exposed exterior walls are of masonry construction.

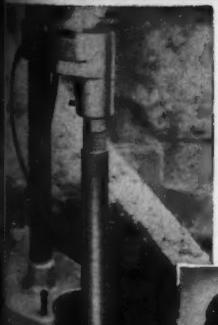
Personnel

Job superintendent W. R. "Bill" Glaubitz supervised the construction for A. A. & E. B. Jones, Inc. C. Donald Johnson of Rocky Mountain Pre-Stress, Inc., was on the job during the two days the roof system was being erected.

THE END



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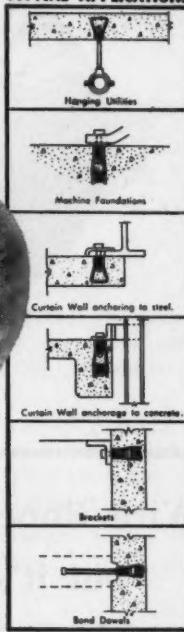
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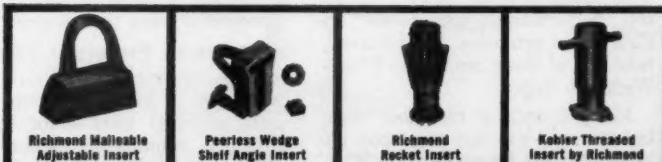
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81



Working behind the bars of the Nevada State Prison at Carson City, Nev., a P&H 20-ton crane picks a prestressed wall panel off a truck-trailer preparatory to setting it in place for the 44×147-foot maximum-security cell block. Wall, floor, and roof panels were prestressed and trucked 220 miles to the job site. Cost of the work was in line with other methods; security features and speed of the work put this method ahead of others.

Prison cell block built of prestressed concrete

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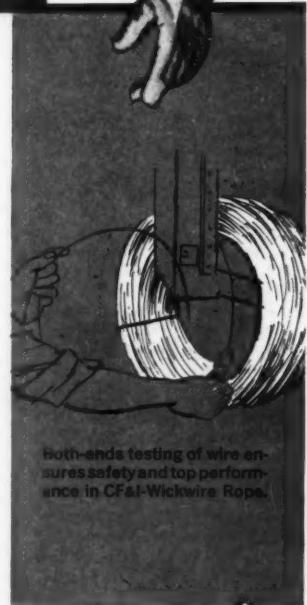
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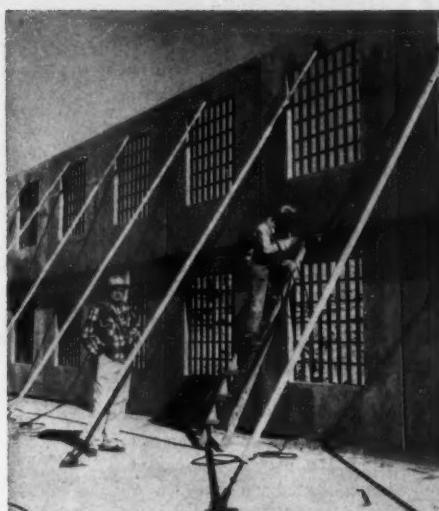


Wire bails cast into the concrete wall section provide attachment points for the three lines that suspend the panels from the crane hook. The special frame on the truck accommodated panels that were difficult to handle lying flat.

CONTRACTORS AND ENGINEERS



An interior wall panel with blocked-out doorway is set in place next to a section that is being welded to inserts in the floor. The pre-tensioned interior panels have channel surrounds cast into them; these are welded to flat bars embedded in floor and ceiling.



A workman welds a steel ledger to wall panels that are held in place by telescoping shores. The shores, developed by Basalt Rock Co., Inc., Napa, Calif., attach to panels and the floor with Superior 1-inch coil inserts. Fine adjustment of jacks at the bottom makes possible precise plumbing of wall panels.

The biggest advantage was the high speed of erection on the site, together with the minimum of construction personnel and equipment required. Actually, the complete structure above the cast-in-place ground floor was erected in 14 working days by a small crew using one P&H 20-ton truck crane. Since the new addition had to be built while regular prison activities were being maintained in the adjacent section, speed was important. Welding and grouting of the connections, as well as the mechanical, electrical, painting, and other operations continued after the structure was erected.

Casting the panels

While the general contractor was installing the underground utilities, casting the ground-floor slab, and doing other preliminary work on the site, Basalt was casting the panels at its Napa plant. Four general types of panels were made for the walls, second floor, roof, and partitions. Exterior wall panels were cast to the 14.75-foot height of the 2-story building. They were 6 inches thick and about 8 feet wide, and each panel included a "security sash" cast integrally with the wall panel. Interior bearing walls were of single-story height. The wall panels are reinforced with $\frac{1}{2}$ -inch 7-wire pretensioned strands at 12-inch spacing vertically, and with No. 4 mild-steel bars at 12-inch spacing horizontally.

Panels for the second-floor slab are typically 10×18 feet in section and $\frac{1}{2}$ inches thick. They are reinforced with the $\frac{1}{2}$ -inch pretensioned strands in the direction of principal stress. Panels with spans of up to 22 feet are $4\frac{1}{2}$ inches thick, with the 7-wire pretensioned strands at 12-inch spacings in one direction and 3 bars at 10 inches in the other direction.

Partition panels between the cells are also precast and pretensioned. They have channel surrounds cast into them, and these are welded conveniently to flat bars embedded in the floor and ceiling.

All of these panels are cast of concrete, heavy concrete made with sand and gravel aggregates. No light-weight aggregates were used. On Basalt's casting bed, a metal

(Continued on next page)

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(Continued from preceding page)

form kept one side of the panels straight and true while the other sides were formed with metal or lumber, as was convenient. Superior 1-inch coil inserts were cast into the face of the exterior wall panels to engage the lifting hooks. Other panels were fitted with wire balls made from prestressing strand.

Since these panels were cast on a bed not served by the plant's overhead crane, the concrete was placed directly from transit mixers.

Snow holds up trucks

The job of trucking more than 200 panels from the plant at Napa up over Donner Summit in the Sierra Nevada mountains and on to Carson



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It took only 14 working days to complete erection of the panels. The new cell block is virtually complete; crews are applying the built-up roof over the pre-stressed deck.

City, a distance of 220 miles, was shipped to Wells Fargo, Inc. The shipment was made in 41 truck-trailer loads averaging 39,000 pounds each. Many of the loads required overwidth permits because they included panels 11 feet wide.

A snowstorm in the high mountains delayed the delivery of some of the loads, when the highway department restricted the passage of the over-width loads until the snow-removal operation had been completed. Fortunately, this did not seriously delay the erection schedule.

The loads were very carefully scheduled to deliver the panels in the proper sequence for erection. As the trucks arrived at the site, the P&H 20-ton truck crane lifted the panels from the trailers and set them in place in the structure. The heaviest unit was a 22x11-foot roof panel weighing 7.5 tons.

Exterior wall panels were erected first. As each panel was set in place on the floor slab, it was supported in a vertical position by a telescoping tubular steel brace. These braces, fabricated by Basalt, attached to the panels and to the floor with Superior coil inserts. Screw adjustments on the braces made it possible to plumb the panels accurately.

Interior walls, partitions, second-floor, and roof panels followed in logical succession. As the units were assembled, they were partially welded to hold them in place. Then, when erection was completed, the continuous welds were made.

The erection of the panels began on February 24, 1959, and was completed in 14 working days.

All voids between the panels were carefully filled with nonshrink grout. This was rapidly and neatly applied by a shop-made "bazooka" consisting of a piece of tubing fitted with a plunger. One end of the tubing was flattened and shaped to produce the desired finish as the grout was forced into the spaces.

Personnel

The job was supervised for McKenzie Construction Co., Inc., by superintendent R. F. "Bob" Sheehan. The erection of the prestressed panels was supervised by field engineer George Amoss of Basalt Rock Co., Inc. G. C. Slater represented the Nevada State Planning Board on the project. Jack Fogliani is warden of the prison.

THE END

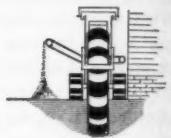
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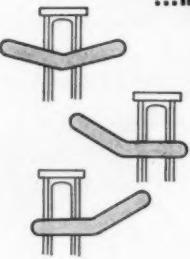
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CONTRACTORS AND ENGINEERS

One of the first concrete catenary structures to be built in the U. S. is this Gulf Oil gas station in Atlanta, Ga. The catenary arch dome is supported by eight box-girder booms from a central compression ring.

Concrete catenary dome roofs gasoline station

The concrete catenary or drape-arch structure of the Lenox Square Gulf Oil Gas and Service Station in Atlanta, Ga., is claimed to be the first of its kind in the U. S. Once the canopy was up, a 54-foot-square gas station was built underneath it.

The foundation of the gas station is composed of spread footings of 18-inch-thick concrete in 4½-foot squares laid on granite bedrock. The footings hold the eight supporting columns, which are set to make an over-all square of 56 feet. Column height varies from 17 to 21 feet to compensate for the slope in the cantilevered booms.

With the supports ready, the next problem was the 128-foot-diameter canopy. The catenary structure consists of a steel column and tapering box-girder booms, connected with an external compression ring. A hole in the center of the ring is for passage. The booms rise 13 feet from the center ring; therefore, the canopy slabs are pushing toward the center, keeping the structure in equilibrium. At the point closest to the compression ring, the catenary slabs are flat; this forms a concrete compression ring that adds stiffness to compensate for rotation.

The compression ring, an 8-foot-diameter octagon composed of plate sections and I-beams of ½ to 1½-inch plate welded together, is under tension. It was put into place at the center on a scaffold and fastened down with heavy cables.

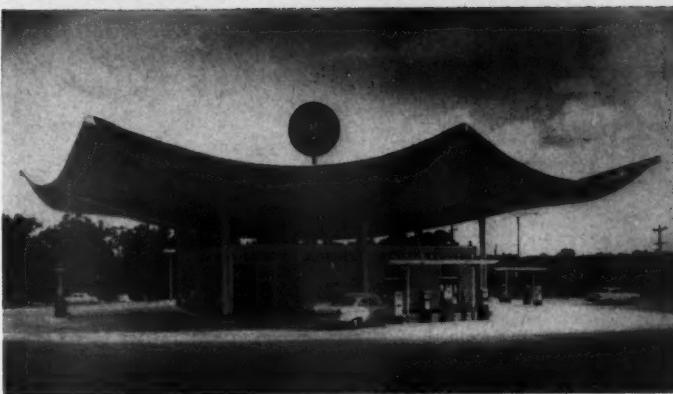
The canopy is not a regular octagon inasmuch as the side angles are wider than the point angles, making it an 8-sided parallelogram; however, it gives an over-all circular appearance. Eight booms were required: 8-foot-long ones at the corners; 60-foot booms to the sides. The 14-inch-wide booms are tapered, varying from 1 to 3 feet in depth, and are of box-girder construction with cross bracing.

The booms were hydraulically bent into shape, bolted, and then bolted to the compression ring and the supporting columns. When the cables holding the compression ring were released, the center rose ¾ inch.

Catenary sags or drapes were then started. Temperature steel was laid parallel to the booms, and reinforcing steel rods of ½ to ½-inch diameter were laid across, spaced 3 to 4 inches apart. Since all of this steel was being set in arcs, a piano wire was strung taut to make sure the sag was of the correct depth. Then a man with a measuring stick walked beneath it, tipping the bottom of the sag. Reinforcing rods were then spot-welded to the booms. On the bottom of the net of reinforcing steel, ¼-inch hot-rolled steel channel lathing was tied with 14-

gage annealed iron wire, to which in turn metal lath was tied.

A small concrete gun was used to shoot on ½ inch of scratching surface, which was then finished with another application of concrete.



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Watertight deck slab

Seven girders for a new Los Angeles parking garage are tensioned on 450-foot-long bed. The harping jig in the web form attaches to all 12 of the $\frac{3}{8}$ -inch strands; a Simplex 10-ton jack powered by a Blackhawk pump raises all strands at once. Post-tensioning cables, right, will be draped in place later.



To obtain a waterproof concrete deck strong enough to be used for parking automobiles, a Los Angeles contractor employed a combination of pretensioning and post-tensioning on the tee-girders and closing slabs that make up the roof of the Downs Garage Building at Sixth and Vermont in Los Angeles. The heavily reinforced tapered columns for the structure were precast on the job site.

Design

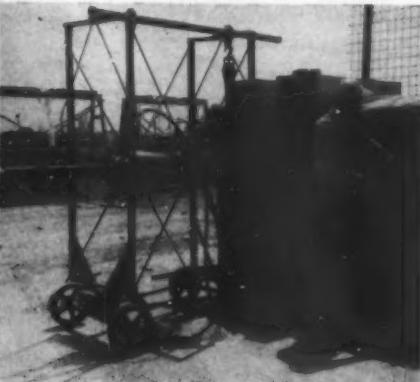
Designed by T. Y. Lin & Associates, Van Nuys, Calif., the structure consists of tee-girders at 17-foot centers spanning 61 feet between the precast columns. A lightweight concrete slab placed over and between the girders is post-tensioned to insure water tightness. The design is especially adaptable to structures of this kind, which demand a wide spacing between columns and a roof deck that is watertight without the application of waterproofing or roofing.

Since the construction requires a minimum of special skills and equipment, the method is especially suitable for use by smaller contractors. The general contractor on this project was Ellis E. White Co., Beverly Hills.

Plant casts girders

The pretensioned "Lin Tees" were supplied by Wailes Precast Concrete Co. from a plant at Sun Valley, a north Los Angeles suburb. Each tee has a stem 28 inches deep and 8 inches wide. The 6-foot-wide flange widens from $1\frac{1}{2}$ inches thick at the

initial tension is applied to the $\frac{3}{8}$ -inch pretensioning cables by a 200-ton jack with a 10-inch stroke. The large blocks at right are the pulling abutments that anchor the pretensioned cables.



Projected Golden Triangle development at Pittsburgh, Pa.

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best traction—in difficult footing such as sand, gravel or mud.

Mack ready-mix trucks, powered by famous Mack Thermodyne® diesel engines or economical Mack gasoline engines, give contractors the on-time dependability vital for meeting precise pouring schedules.

Day after day, other Mack trucks and tractors haul without fail the tons of materials and equipment needed on every construction job.

You can benefit by using Mack trucks

on your next contract. Your branch or distributor will supply with the names of Mack users in field. Compare their operating costs with your own... you'll hand the jobs to Macks. Mack Trucks, Inc., Springfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd., Toronto, Ontario.

MACK
FIRST NAME FOR
TRUCKS

CONTRACTORS AND ENGINEERS

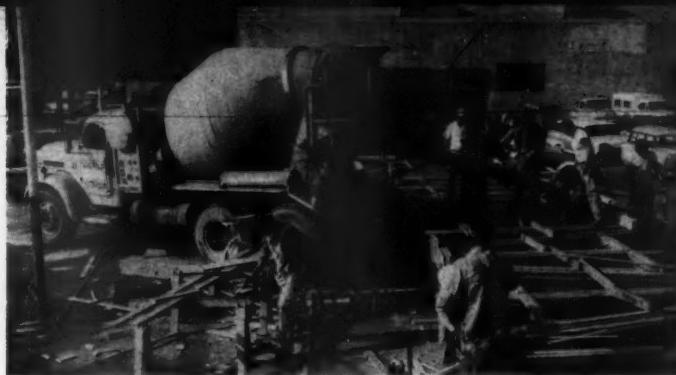
edges to 4 inches at the that joins the web and

Twelve $\frac{3}{8}$ -inch pretensioning cables in the web are tied down at the center of the span and harped up to the top of the web at the ends of the girders. In addition, there are four post-tensioning cables in each girder, each consisting of seven 0.25-inch wires. These cables were draped in the forms after the pretensioning cables had been harped. They hung 2 feet beyond the ends of the present girders and were used to tie to the cast-in-place connections to the building columns. The flange is

reinforced with a continuous mat of 6:6:10:10 welded-wire fabric.

Wailes' precasting bed is 450 feet long between pulling abutments and is wide enough to accommodate two sets of forms side by side. For this job, however, a single long form was used to produce seven of the girders at a time. The 430-foot-long form was designed by Wailes and fabricated locally. By utilizing web inserts and flange adjustments in this form, tee girders can be produced in a wide variety of sizes.

The pretensioning cables are threaded through the form and given their initial tension by a 200-ton



Heavily reinforced columns for the garage are precast on the job site, and enough forms were built to cast all the columns at once. As concrete is chuted from the Challenge mixer on the Cook Bros. truck, a Whiteman vibrator consolidates the mix.

hydraulic jack working behind the pulling abutments at one end of the bed. An electric-powered pump supplies fluid to the jack. A unique feature of this jack is the air motor, which quickly and automatically turns up the big locking nut on the long threaded jacking rod.

Harping the cables down at the center and up at the ends of each girder completes the tensioning. An anchoring device in the center of each span holds the cables down and in proper relation to each other. Another harping jig engages all 12 strands at the end of the spans. A long threaded rod from this jig is engaged by a Simplex 10-ton jack, which raises the twelve strands to the top of the web. This jack is powered by a Blackhawk P182 electric-powered hydraulic pump.

Concrete for the girders is produced at the site, delivered in transit mixers, and placed by a Northwest crane using a Gar-Bro 1-yard bucket. Electric vibrators consolidate the concrete in the stem, while the flange is finished by a shop-built electric vibrating screed. The crane picks the 10-ton girders out of the form, transfers them to the curing and storage beds, and loads them on the truck-trailers for delivery to the job site.

While the girders were being cast at Sun Valley, the general contractor was busy on the job site. Following the general site grading, caisson footings were drilled to an average depth of about 16 feet by George F. Casey & Co., which used a Calweld drilling rig. The 16-inch caissons were belled out to 4.5 feet in diameter at the bottom. They were initially filled with concrete to within about a foot of the ground. Later, this last foot of concrete was placed and the column-bearing plates were set.

Columns are precast

The columns were precast right on the site in a set of job-fabricated gang forms. The heavily reinforced columns widen from 1 foot at the bottom to 3 feet at the top and are 10 inches thick. In forming the columns, White used a newly developed plastic chamfer strip to replace the wood V-strip commonly used to chamfer corners. These plastic strips, supplied by W. J. Burke, can be cut with a saw; they were attached to the forms with a stapling gun.

Once the components were ready, the building went together fast.

(Continued on next page)

For more facts, circle No. 326



Yard after yard of ready-mix concrete hauled by Mack trucks is used to build retaining wall at construction site.



Brawny Mack Model B-63SX 47,000 lbs. GVW dumper helps in excavation for Pittsburgh hotel foundation.



Heavy loads meet their match in rugged Mack dumpers, whose quick cycling keeps shovel busy at underground garage project.

(Continued from preceding page)

Using a rented motor crane, White set up and braced the columns. Then as the girders were delivered, they were set in place on the columns and shored, pending stressing of the post-tensioning cables. The underside of the slab between the girder flanges was formed and shored, and the 4½-inch (3-inch over the girders) lightweight concrete slab was placed. The connecting segment between the columns and the ends of the girders was placed with the deck.

Two bays of the deck were cast together. In these decks, prestressing cables were installed in both directions. Perpendicular to the direction of the girders, cables containing six 0.25-inch wires were installed at 30-

inch centers. In the longitudinal direction, three cables, each containing six 0.25-inch wires, were placed in each bay. This nominal longitudinal prestressing was installed simply to prevent cracking and thus assure watertightness.

With the shoring in place, the tension was applied to the cables in both directions in the slab. Then, with the dead load of the slab applied to the girders, the four post-tensioning cables in each girder were stressed. After this, the shoring under the girders was removed. All of these field operations, included the post-tensioning, were done by the general contractor with his own forces.

There are practically no walls be-

tween the columns except for two short sections on either side; these are designed to resist seismic forces. These sections of concrete wall are dowled to the columns. The roof was designed for a live load of 60 pounds per square foot to accommodate automobile parking. The cost of the structure was in the neighborhood of \$750 per parking space.

Personnel

The job was supervised for Ellis E. White Co. by C. H. "Chuck" Rice, who also acted as coordinator for T. Y. Lin & Associates. At the Wailes Precast Concrete Co. plant, A. R. Knight was superintendent of operations, while Richard W. Wickert represented the Lin organization.

THE END

Convention Calendar

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November 5-6 American Concrete Pressure Pipe Association

Meeting, The Fairmont, San Francisco, Calif. Mrs. Marjorie L. Congleton, secretary to the managing director, ACPPA, 228 N. LaSalle St., Chicago 1, Ill.

November 16-20 Corrosion Control

Fourth Annual General Florida Conference, Key Biscayne Hotel, Miami, Fla., sponsored by the Miami Section of the National Association of Corrosion Engineers. T. J. Hull, executive secretary, CSC, 1061 M & M Bldg., Houston 1, Texas.

November 17-19 Building Research Institute

Fall Conferences, Shoreham Hotel, Washington, D. C. Harold Horowitz, assistant director for technical programs, BRI, 2101 Constitution Ave., Washington 25, D. C.

November 23-25 Southeastern Association of State Highway Officials

Meeting, Eden Roc Hotel, Miami Beach, Fla. Ralph Davis, secretary, SASHO, Florida State Road Department, Holland Bldg., Tallahassee, Fla.

November 30-December 3 American Institute of Steel Construction

Annual Meeting, Boca Raton Club, Boca Raton, Fla. L. A. Post, executive vice president, AISC, 101 Park Ave., New York 17, N. Y.

December 2-3 The Asphalt Institute

Annual Meeting, Shoreham Hotel, Washington, D. C. TAI, Asphalt Institute Building, University of Maryland, College Park, Md.

January 11-15, 1960 Highway Research Board

Annual Meeting, Sheraton Park Hotel, Washington, D. C. Fred Burggraf, director, HEB, 2101 Constitution Ave., Washington 25, D. C.

January 18-21 American Road Builders' Association

Annual Meeting, Netherland Hilton Hotel, Cincinnati, Ohio. Norman T. Alquist, administrative services manager, ARBA, 600 World Center Bldg., Washington 6, D. C.

January 24-28 Associated Equipment Distributors

Annual Convention, Conrad Hilton Hotel, Chicago, Ill. W. G. Bowman, executive secretary, AED, 30 E. Cedar St., Chicago 11, Ill.

January 25-27 Association of Asphalt Paving Technologists

Meeting, Hotel Peabody, Memphis, Tenn. Ward K. Parr, secretary-treasurer, AAPT, Box 619, 1224 E. Engineering Bldg., University of Michigan, Ann Arbor, Mich.

January 25-28 Plant Maintenance and Engineering

Show and Conference, Convention Hall, Philadelphia, Pa. Clapp & Polak, Inc., 341 Madison Ave., New York 17, N. Y.

January 27 The Moles

Annual Award Dinner, Waldorf-Astoria Hotel, New York, N. Y. Marguerite McLean, headquarters secretary, The Biltmore, Madison Ave. at 43rd St., New York 17, N. Y.

Firestone erects plant

■ Construction of a multimillion-dollar tire manufacturing plant by Firestone Tire & Rubber Co. of Canada, Ltd., has started on a 54-acre site in Calgary, Alberta. Production plans call for a full line of passenger, truck, bus, farm, and implement tires. Manufacturing operations are expected to commence by the fall of 1960.

CONTRACTORS AND ENGINEERS

187-TON GIRDER
SET BY THIS
MANITOWOC

Backbone of a new triple-decked intersection for Chicago's Northwest Expressway is a 187 ton steel girder . . . the heaviest single piece of its type ever erected in the city. Measuring 126' x 13', this is the heaviest steel girder ever shipped in one piece by the American Bridge Division of the U. S. Steel Corp. Mounted on reinforced concrete piers, it will support 60 smaller girders. These, in turn, will support ten tracks of the North Western Railroad carried over the intersection at this point.

To handle the giant girder, American Bridge used the largest capacity crawler crane made — a 125 ton Manitowoc Model 4000. The great capacity of the big Manitowoc was a key factor on the project which entailed lifts such as 95 tons at a 25½ ft. radius. The Model 4000 was equipped with 80' of the Manitowoc "T" section style boom for the job.

Adjacent to the job site the Manitowoc crane placed the girder on two 100 ton railroad "push" cars which carried it on a special length of track to a point alongside the concrete support columns. After lifting one end of the girder in place, the big crane inched through a passageway under a temporary construction track to set the other end of the girder in place. In every respect a tough job in tight quarters.

For a detailed report on the 125 ton capacity Manitowoc Model 4000 see your Manitowoc distributor soon. Only the Model 4000 does the "impossible" by handling lifting jobs that formerly required two or more rigs. No other crawler crane can match this record!

MANITOWOC ENGINEERING CORP.
(A subsidiary of The Manitowoc Company, Inc.)
MANITOWOC, WISCONSIN

CRANES | SHOVELS | DRAGLINES | TRENCH HOES
25 TON - 125 TON | 1 1/4-YD. - 6-YD. | 1 1/4-YD. - 6-YD. | 1 1/4-YD. - 3-YD.

For more facts, use Request Card at page 18 and circle No. 227

**Twin mobile radio telescopes
have 150-ton welded steel frames**

Over 150 tons of structural, heavy plate, and tubing, largely assembled by arc welding, went into the construction of each of twin mobile radio telescopes in the Owens Valley desert near Bishop, Calif. The installation cost to over \$1.5 million, financed principally by the Office of Naval Research, and is currently operated by the California Institute of Technology.

The function of the antenna dishes is to receive radio waves from a selected point in interstellar space and focus them to a central collector point that funnels the impulses to amplifying equipment at a ground station. There the signals are transferred to pen recorders, oscilloscopes, or magnetic tape, for interpretation. Each of the 90-foot-diameter 40-ton antenna dishes has a parabolic revolving surface of 18-gage expanded steel mesh with an area of 100 square feet. This mesh was used to permit passage of wind and sun. The supporting framework comprises a network of radial trusses made up of 4-inch tubing, welded in sections in the shop and then tied together by field welding in specially built jigs. A system of 324 adjusting screws on the frame makes it possible to force the skin inward or outward to maintain a true parabolic surface within plus or minus 1/16 inch. The dishes can rotate 360 degrees in a vertical axis through electric-motor drive and gearing, and can also be elevated to any position from horizontal to vertical through sector gears and a large declination tube.

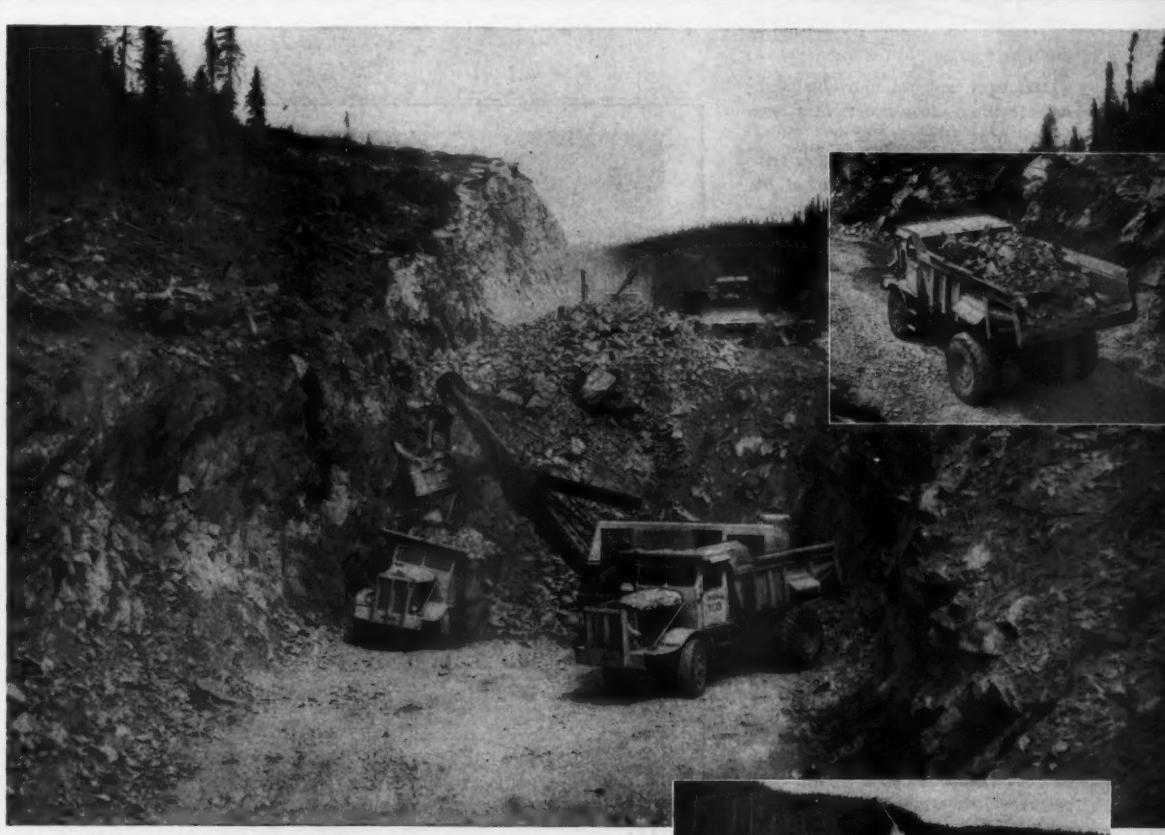
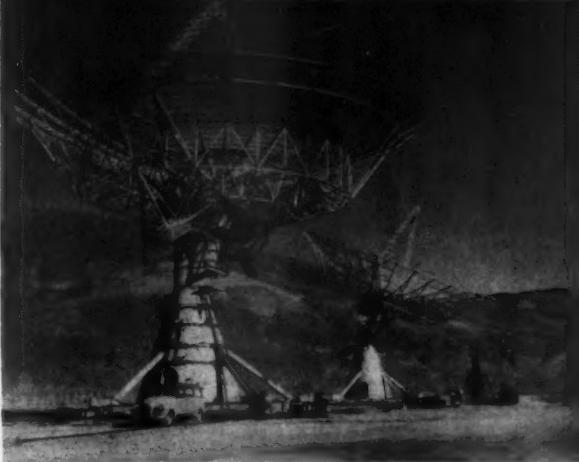
The structure rests on a carriage equipped with wheeled trucks riding on tracks 35 feet apart and 1,600 feet long. On the carriage is mounted a central base about 30 feet high, and above that a pedestal and yoke rise another 25 feet. The yoke carries the polar axis shaft and declination tube that support and traverse the antenna dish.

Each of the two 9,000-pound 11½-foot-diameter sector gears, through which the declination tube is driven, mesh with their respective pinions to within .005 inch at each tooth along the entire 18-foot periphery of the gear.

Eventually, it is planned to operate the telescopes on two tracks at right angles, one east-west and the other north-south. By teaming the units, it is hoped to extend interferometer measurement techniques. In actual operation, the weight of the instrument is transferred from the wheeled trucks to steel caissons sunk 10 feet into the ground at regular intervals alongside the tracks.

The declination tube, as well as all other welded subassemblies, was fabricated in the shops of the general contractor, Allison Steel Mfg. Co., Phoenix, Ariz. Welding equipment and electrodes were principally manufactured by The Lincoln Electric Co., Cleveland.

Twin radio telescopes, with 90-foot parabolic open-mesh antenna surfaces, can be focused on any point above the horizon. Located in the Owens Valley desert near Bishop, Calif., the radio telescopes have supporting structures of arc-welded and stress-relieved steel-plate, structural, and cold-rolled tubing.



EUCLIDS RUSH

"Life-Line"

TO ORE MINE



Because of its location in a very remote and practically inaccessible area of northern Quebec, a big iron ore mining development awaits completion of a new 200 mile railroad. When operations are in full swing, iron ore from Quebec Cartier's new mine will be transported by rail to Port Cartier, east of Shelter Bay on the St. Lawrence River. From there it will go by ship to steel mills in the United States, Canada and Europe.

Construction of this railroad through rugged country is a big tough job—one that requires dependable, large capacity equipment to keep the rush project on schedule. Pitts-Foley Co., contractors, are using 25 Euclid Rear-Dumps of 22-ton capacity.

Powered by diesel engines of 300 h.p., these "Eucs" haul heavy rock excavation from cuts to fill areas. In spite of steep grades, rough roads and an operating schedule of 20 hours 6 days a week, these heavy duty haulers are maintaining an availability record of 90% or better.

With over 25 years of experience in building specialized earthmoving equipment, Euclid and its world wide dealer service organization offers you bonus benefits that bring a greater return on investment. See your Euclid dealer for technical assistance with any off-highway hauling problem.

EUCLID Division of General Motors, Cleveland 17, Ohio



EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

Steel bars simplify girder post-tensioning



Steel bars, each taking the place of about a dozen tendons, are used in post-tensioning 81-foot girders for a bridge near Minneapolis. A double hydraulic jack does the tensioning. Part of the jacking unit is a 100-ton ram that stretches the bars about 4½ inches. The other part is a Simplex 15-ton jack that rams home a conical wedge to hold tension on the bar. Wedge and jack bear on steel end plates that were not formed in the concrete.

(Additional photos on facing page)



Steel bars replaced individual tendons in the 81-foot girders of a twin bridge near Minneapolis.

With a choice of using either tendons or bars, McCree & Co. of St. Paul, holder of the \$215,000 contract, chose bars. Each of the 1½-inch-diameter bars took the place of about a dozen tendons, and the special-alloy bars were more convenient to set in place than the tendons. They made possible a fast job of post-tensioning the girders, and they saved the contractor a considerable amount of time and expense.

Stresssteel Corp., Wilkes-Barre, Pa., supplied the bars and post-tensioning equipment and also furnished advice concerning the design of the girders. Bridges built by its special method have spans ranging from 60 to 130 feet.

Located just south of Minneapolis, the twin bridges carry the four lanes of Cedar Avenue over U. S. 5 and 100 (Interstate 393), which is currently under construction. Each bridge has two 81-foot spans. Ten girders on 4.5-foot centers carry a reinforced-concrete deck, which has an over-all width of 44 feet. The bridge was designed by consultant Gilbert H. MacMillan of Minneapolis and built under the supervision of the Minnesota Department of Highways.

To build the 40 girders for the twin structures, McCree set up a casting yard at the site. The beds provided enough room for 20 girders. The contractor first tried to support the girders on mud sills but eventually went to a concrete footing. The footings under alternate girders were 2 feet wide and 4 inches thick. The concrete supported 2×6 joists, to which the plywood girder bottom was nailed.

Reinforcing steel welded

The first step in building the 81-foot girders was to set the stirrups and longitudinal steel in place. The members were welded together to make the steel skeleton more sturdy.

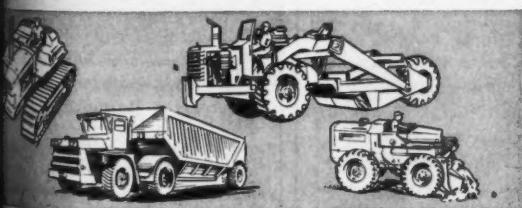
Next, eight steel bars, in jackets of flexible tubing, were set in place. Plywood templates, with holes for the bars, were set at 6-foot intervals for the length of the girder so that the correct sag in the bars was obtained. After the bars were wired in place to the reinforcing steel, the plywood templates were removed. Specially

(Continued on page 92)

What's it costing?



you to keep the clutch pedal?



Allison 

TORQMATIC® DRIVES

THE MODERN DRIVE FOR MODERN EQUIPMENT

For more facts, use Request Card at page 18 and circle No. 329



Girders cure, under wet burlap covered with polyethylene plastic, for about 12 days on the 20-girder bed at the bridge site. Curing continues until the concrete reaches a compressive strength of 4,500 psi.



Two Lorain Moto-Cranes set one of the 81-foot, 25-ton girders in position between the center pier and an abutment. Each girder was positioned near the bridge by a rubber-tire trailer and dolly pulled by a tractor-dozier. The Lorains also teamed to load the girder to the trailer and dolly.



Joists of different heights support the plywood decking. The bottom of the deck is several inches above the girder tops; plywood decking is "boxed up," background, in the area between girders and diaphragms. Wire hangers straddling the girders support the joists.



Form lumber is cut beneath the bridge by a carpenter with a SkilSaw. The saw is powered by a gasoline-driven Kohler electric plant. The timbers that support the diaphragm forms are supported by long bolts hung from steel straps that straddle the girders.

(Continued from page 90)

built lightweight steel forms enclosed the 45-inch-high girder.

When the forms were in place, ready-mix concrete was bucketed to the girder. The 5,000-pound mix contained an air-entraining agent to yield a 5 per cent air mixture.

The girder cured for about 12 days under wet burlap covered with a layer of plastic, until a 4,500-pound compressive strength had been reached. The small but efficient crew built one girder a day.

Tensioning

The tensioning of the eight bars of the girder moved along swiftly. A crew of four men—two at each end—took only an hour to pull one girder.

Hydraulic jacks worked at each end of the girder so that two bars were pulled simultaneously.

Each of the jacks was a double unit. The main unit, consisting of a 100-ton ram, applied a force of 55 tons to the bar, stretching it about $4\frac{1}{2}$ inches. After the bar had been pulled, the secondary unit, a 15-ton hydraulic jack, shoved home a conical wedge that held the tension on the bar. Both the conical wedge and the double jack pressed against steel anchor plates. The anchor plates, which were not cast in the concrete, were held in place by the tensioning bars.

With the bars tensioned, a sand-cement grout was pumped through a $\frac{1}{4}$ -inch hole in the anchor plate. The grout bonded the bar to the flexible tubing.

Equipment and materials

- 1 Lima crane for concrete placing and miscellaneous work
- 2 Loral motor cranes of 30-ton capacity, rented for erection of girders
- Bars and post-tensioning equipment furnished by Stressteel Corp., Wilkes-Barre, Pa.
- Steel girder forms, made specially for this job by U. S. Construction Products Co., Inc., Milwaukee
- Moyno grout pump
- Darex air-entraining agent
- A SkilSaw powered by a Kohler generator

Euclid releases film on Big Three products

■ A 16-mm sound- and color film "Power Plus . . . Matter of Perspective," is available from the Sales Promotion Department, Euclid Division, General Motors Corp., Cleveland 17, Ohio.

The 22-minute movie features Euclid's Big Three products: the S-18, a 21-yard-struck scraper; the twin-power TC-12 crawler tractor with 425 net horsepower; and the all-wheel drive, 563-hp TS-24 twin scraper. A section on each of the three products covers design features and various types of job applications.

Equipment users, trade or civic organizations, and schools or universities may borrow the film.

NEWS ABOUT THE DUMP BODY BUSINESS

Performance Bonus!



Six Marions Provide Big Daily Payloads On Double-Duty Fill Dirt-Coal Hauling Jobs

Since May, 1958, six Marion 13 cubic yard bodies have been performing double-duty for Frank Murphy Trucking of Zanesville, Ohio. On days when the weather prevented hauling dirt for building an overpass on highway 16 in Newark, Ohio, the units were kept busy hauling coal.

The owner, Frank Murphy, has been well pleased with the continuous operating dependability and efficiency of the units during these nine months. On the road building job, each truck has maintained a high daily payload rate of 450 yards of dirt during each 10-hour shift. Each unit makes 40 to 50 trips of $1\frac{1}{2}$ miles round trips a day. The Marions are loaded in 30 to 40 seconds with a grader-conveyor. The Marions are raised with a Marion front telescopic hoist Model LF-614-T-120.

The 13 cubic yard bodies are raised with a Marion front telescopic hoist Model LF-614-T-120. Get all the facts on Marion bodies and hoists for construction . . . quarrying . . . mining . . . all your hauling requirements.

**MARION METAL PRODUCTS CO.
Marion, Ohio, U.S.A.**



For more facts, use Request Card at page 18 and circle No. 330

COMMENT from the **BUTLER ENGINEER**

. . . of rumors replete with conjectures

How news does get around the cement handling industry! And often in such cases the news is cloudy with rumors—often quite unfounded.

The recent discussions of self-unloading cement transports which put the cement directly into your bin are examples. Some rumors had it that these are the complete and perfect solution to all cement handling . . . other whispers said they were entirely impractical.

Well, they are here, they're good and they have a very definite place—with some qualifications.

Perhaps your plant is in an area served by these cement transports. Or if it is not, very probably it soon will be . . . at any rate, you're going to be hearing a lot of rumors, pro and con. What's the best way of determining what you should do take the utmost advantage of this development? Well, Butler Bin has made very careful investigations and is well prepared to make specific and individual recommendations. Moreover, Butler Bin will provide auxiliary equipment best adapted to your problem.

So why not ask the Butler Engineer? It's as simple as that. There is a Butler Ready Mix Plant—an HP-85—on a high pressure schedule supplying concrete for the first Atlas missile base. This is said to be the highest priority construction job in the entire country. The erection of the HP-85 was started at 9:00 A.M. and finished at 4:00 P.M. the same day. This takes 3 talents: a knowledgeable crew; highly astute management and the up-front portability that only Butler provides.

Shoot at that mark, gentlemen. The Butler Engineer

**BUTLER BIN COMPANY
WAUKESHA, WISCONSIN**

For more facts, circle No. 331

CONTRACTORS AND ENGINEERS

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SINCE 1872

Random-width wood forming cuts costs of radar tower

Random-width, rough-cut lumber in formwork has reduced the cost of building a concrete Air Force radar tower at Thomasville, Ala.

Burns & Roe, Inc., New York City consulting engineers, specified lumber of unequal width to form deliberate steps in the wall. This would make normal unevenness unnoticeable, and would eliminate the high cost of hand rubbing and finishing. Since the lumber was rough-cut, the concrete picked up the grain structure of the wood, creating a decorative effect.

Forms for exterior walls between columns, a distance of some 20 feet, were of No. 2 grade or better lumber, 10 to 12 inches wide and from $\frac{3}{4}$ inch to $1\frac{1}{2}$ inches thick, with horizontal studs. The panels were designed and spaced to achieve a minimum wall thickness of 10 inches.

Each floor and its four supporting walls is monolithic. The building is, in effect, a series of five stacked concrete boxes tied in by means of the reinforcing steel.

The floors are of a waffle-type design with thin wire-mesh reinforcing in the top slab between ribs. This design provided for the rigidity required for the electronic equipment. Another cost-cutting device was the use of cardboard egg-crate-type cores in placing the wafflelike floors.

Panels were made up of varying thicknesses of lumber held together by 1×3 -inch battens. Plywood strips nailed along the joints prevented escape of the concrete and reduced the possibility of honeycombing in the finished wall. The panels were coated with form oil, hoisted into position, and secured with form ties and cables. The wales were left loose until studs had been inserted between them and the composite panel; form ties were then tightened.

For more facts, circle No. 333 →



GIVE YOUR CRANE OPERATOR A BREAK!

EAGLE NI-HARD AND SEMI-STEEL BREAKER BALLS for faster, easier demolition, breaking and crushing.

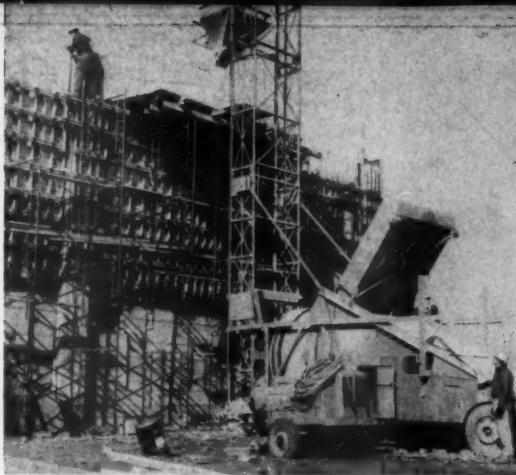
Tough semi-steel for regular jobs, 1500 to 6000 lb. Abrasion resistant Ni-Hard nickel-chromium iron alloy for the tougher jobs, 1500 to 4000 lb. The pear shape packs the weight. Easily replaced hook. Also spherical balls for use with crane magnets. Ask for Bulletin 558. Eagle Pile Hammers and Leads in Bulletin 1255.

EAGLE IRON WORKS
159 Holcomb Ave.
Des Moines, Iowa
SINCE 1872

EAGLE SAND AND GRAVEL WASHERS • ROAD BASE MIXERS • DREDGE EQUIPMENT
For more facts, circle No. 332
NOVEMBER, 1959

Ordinarily, panels would be nailed to studs and erected as a unit. However, by sliding studs into place and confining the size of the panel, the crane required to handle heavy forms was eliminated. Two slings raised the panels to the required elevation.

Forms were left up for seven days while concrete cured. After forms were removed, core holes were filled. They were not rubbed smooth, but were board-marked to blend with the surrounding rough-textured finish of the wall.



A decorative effect is achieved by use of various widths of rough-cut lumber forming for concrete in this Air Force radar tower at Thomasville, Ala.

ALL NEW INSLEY M TRUCK CRANE 20-ton capacity yet lightweight for travel

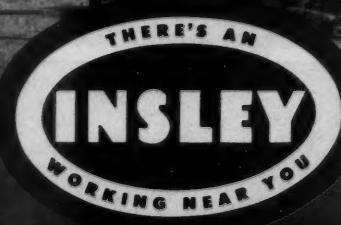
- The all new Insley Type M gets to the job and on the job just with a minimum of preparation time.

Such features as simplified back-hitch gantry (requiring only minutes to raise or lower), independent boom hoist, pendant type suspension with floating bridle connections to boom for quick change of sections, hammer-head type boom point with three wide flange sheaves, and a modern wide-vision cab are but a few of the reasons why contractors are

calling the Insley M the best all-round truck crane on the market.

Unmatched flexibility of job handling is available with such optional features as: power load lowering, third drum, remote control and shifting base for upper works.

There are many new design features inside the M's eye-pleasing, wide-vision cab. Ask your Insley Distributor about them today.



INSLEY MANUFACTURING CORPORATION
General Offices • Indianapolis 6, Indiana



plant on site more than pays for itself

Faced with the job of building a school largely of precast or prestressed components, Corbett Construction Co., Chicago, Ill., built two beds on the site and handled the precasting and prestressing itself to save time and job expenses. One bed produced channels and single tees. This is the 350-foot-long beam bed; concrete is being chuted directly to the forms by a Smith mixer on an International truck.

Maginniss motor-in-head concrete vibrators—best for every job!



Use the right tool...

Skilled mechanics are careful to use the tool best suited for the job at hand. Profit-conscious contractors, too, use equal care when selecting concrete vibrating equipment.

And, because Maginniss builds both Hi-lectric induction motor-in-head vibrators for heavy work and Uni-lectric series motor-in-head vibrators for light

work, you can choose the vibrating tool best suited for your construction jobs—large or small!

For better concrete...higher production...lower costs, see your Maginniss distributor. He'll recommend the Maginniss motor-in-head vibrator exactly right for your needs.

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HI-LECTRIC vibrators, featuring powerful induction motor-in-head design, are ideal for continuous use in heaviest service. Use them on bridges, culverts, heavy structures of all types and on paving jobs.

listed under "Contractors' Equip." in 85 principal cities



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For all your concrete vibrating needs...



For more facts, use Request Card at page 18 and circle No. 334

By rolling out its own prestressed products at a yard set up at the site of a new school in Dalton, Ill., just south of Chicago, Corbett Construction Co., Chicago, Ill., saved the project sponsors time and money.

Corbett cut five months off the time that a commercial prestressing plant wanted to do the job. With the plant on the site itself, Corbett had complete control of the flow of materials to the building. The cost of transporting the prestressed members was greatly reduced. In fact, the amount of money saved more than paid for the initial expense of setting up the two prestressing beds.

Novel design

Corbett was putting up an unusual building. All members of the frame, floors, and roof of the school are either precast or precast, prestressed concrete. Two-story columns; crawl-space wall slabs; and the small, lightweight roof planks were precast. Beams, channels, and single tees were prestressed. The only prestressed members not made on the job were the extruded hollow-core floor planks; these were made by a commercial plant.

The novel design saved the taxpayers money. According to Corbett's project manager, Mario Egid, the per-foot cost of the building was much less than that of comparable steel construction. The bid price on the high school was \$13.96 per square foot. This included all the mechanical work and foundation substructures, none of which were included in the bid made by general contractor Corbett.

Thornton Township East High School is big. Designed by Samuel & Sandquist, architectural and engineering firm of Chicago, it has three 2-story classroom buildings, a 1-story industrial arts building, an auditorium, two swimming pools, and a physical-education building.

Of the total of 260,000 square feet of floor space, about 238,000 square feet is precast, prestressed construction. The only building that does not use precast members is the circular auditorium. It is of poured-in-place construction, with steel trusses supporting the circular roof. The exterior walls of the auditorium are of commercially produced precast lightweight concrete wall panels. Exterior walls of all other buildings are either brick or glass curtain wall.

The actual framing of the buildings went fast. The casting of the prestressed members started in June 1958. By the middle of October of 1958, the last of the 1,200 tons of concrete had been cast. The school was completed in December 1958. The entire project cost \$1,200,000.

(Continued on page 96)

CONTRACTORS AND ENGINEERS



Part of Haskins' Allis-Chalmers fleet is shown in a big cut on one of his early Oklahoma Interstate 40 jobs.



Ben Haskins, Cordell, Oklahoma, contractor, finished his fourth contract on Interstate Highway 40 in Oklahoma 35% ahead of schedule.

The first three were handled with similar speed. Interstate 40 is a new four-lane, controlled access highway which, when completed, will link Los Angeles, California, and Durham, North Carolina, with connecting Interstate routes to the Atlantic Coast. On his fourth contract — a 1,200,000-yd., \$497,000 job at the west edge of Clinton, Oklahoma — Haskins timed his Allis-Chalmers motor scrapers at 75 minutes per 3.26-mile cycle. Deducting 30 seconds for loading, Haskins had 7 minutes left for travel and spreading . . . a remarkable 27.7 mph average. These units are rated conservatively by Allis-Chalmers at 27.9 mph in fifth gear.

About 50% of the hauling was upgrade . . . averaging 3%. The motor scrapers had to negotiate a 15-ft dip from haul road level to detour around a bridge. The TS-260's took this detour in fifth gear. Another 2,000 feet of the haul road passed through a business district in suburban Clinton on existing Route 66. Regular traffic was maintained.

The Oklahoma Interstate 40 jobs handled by Haskins called for loading sandy clay, sandstone and shale. Most of it was ripped for fast, efficient loading. Two unusual cuts were encountered — 55 and 65 feet deep, 1,000 feet long and about

OKLAHOMA INTERSTATE 40 TAKES SHAPE FAST:

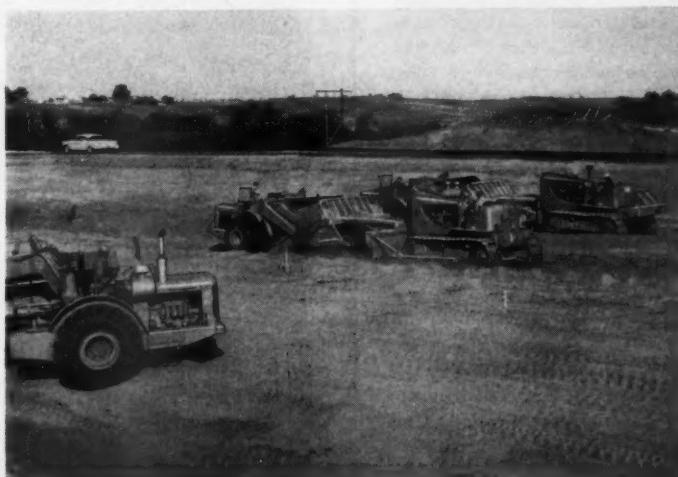
Haskins Beats Schedule on Four Consecutive Contracts

400 feet wide at the top.

To handle jobs like this in less than scheduled time takes top-notch equipment. Haskins is proving he has it. His selection of motor scrapers was made after he timed loading cycles, scaled loads and recorded travel speeds to determine comparative yards moved per hour by the three leading makes. He chose Allis-Chalmers TS-260 motor scrapers. The rest of his fleet, all Allis-Chalmers, was selected just as carefully.

Ben Haskins' extreme dedication to detail both in the planning of his jobs and the selection of equipment has been rewarded with fast . . . yet solid growth for his 13-year-old company. Haskins personally checks every job to be bid . . . every machine to be considered for purchase. The unusual efficiency of his operations and equipment helped him complete his Interstate 40 contracts 35% ahead of schedule . . . has earned him the healthy respect of his fellow contractors who have to bid against him.

Haskins figures on . . . and gets better than 90 per cent availability of equipment during the 270 ten-hour working days he averages each year. You are entitled to performance like this on your jobs. You'll get it with Allis-Chalmers construction machinery. Your dealer has the equipment, facilities and know-how to put you out in front of your schedules. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.



Some of Haskins' new TS-260's loading tough clay, sandstone and shale. The material was ripped for most efficient handling.

Allis-Chalmers equipment used by Haskins on Interstate 40 contracts included TS-260 motor scrapers, HD-21 crawler tractors, HD-16 crawler tractors, HD-11 crawler tractor, HD-11G tractor shovel, FORTY FIVE motor graders.

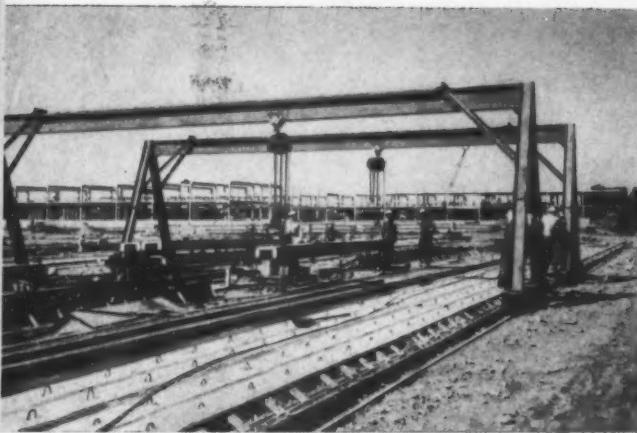


TS-260 230 hp, 17 yd heaped, 44,800 lb

move ahead with **ALLIS-CHALMERS**
... power for a growing world



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(Continued from page 94)

that year, the structural frames of all the buildings were completed.

Prestress plant

The contractor's prestress plant, set up near a corner of the building site, contained two beds. One produced girders; the other produced channels and single tees.

The 350-foot-long girder bed was wide enough to accommodate three rows of girders. The bed was sunk about three feet into the ground so that concrete could be placed easily by transit-mix trucks. Wood forms boxed in the girders, which were normally 27 feet in length. Each girder was formed with a ledge on each side to support the ends of the floor planks and single tees.

In tensioning the strands, an Owatonna 20-ton jack pulled the 7/16th-inch cable to a final tension of 18,900 pounds per strand. Using natural curing, the bed put out about 1,250 linear feet of girders per 40-hour week.

The second bed, which was at ground level, produced channels and single tees. It was 270 feet long and wide enough to hold about six rows. It, too, was served by a 20-ton hydraulic jack that pulled the individual strands to 18,900 pounds. The normal length of the prestressed members was 27 feet. Using natural curing, the bed produced about 1,700 feet of single tees and about an equal amount of channels per 40-hour week.

Gantries speed stripping beds

Each of the beds was spanned by two rolling gantries. Built by the contractor, the steel gantries assisted in picking up prestressed members from the beds and placing them off to one side. Since most of the concrete members were comparatively light (2 to 4 tons), the gantries were pushed along rails by several laborers. The members were readily lifted by chain hoists.

Members placed beside the bed were picked up by a Ross underbody carrier and transported either to a storage area or directly to the building.

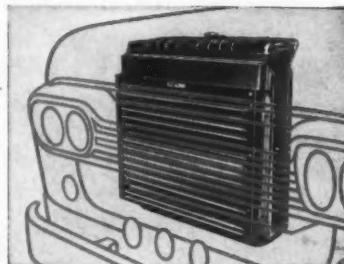
The 28-foot-high columns, which are not prestressed, were precast in wooden forms. Haunches, cast into the column to receive the beams,

Channels and tees needed for the school construction are cast on this 6-row bed. The 270-foot-long bed is served by two rolling gantries equipped with chain hoists that lift the 2 to 4-ton members. Gantry is pushed by hand by workmen.

A 27-foot prestressed spandrel beam that forms a part of the roof for the 1-story section of the school is set in place by a P&H 755B. Diagonal and horizontal wood bracing steadies the columns during erection. ▶



NOW! Certified Durability



CLOSER TEMPERATURE CONTROL obtained with automatic radiator shutters means longer engine life, more efficient operation. Temperature variation between 167° and 187° with shutters as compared to 102° to 181° without shutters was reported and certified in loaded vehicle road tests.



LONGER WIRING HARNESS LIFE is the direct result of Ford's greatly improved electrical wiring system for 1960. Ford's '60 wiring harness and the 1959 wiring harness were subjected to shaker table tests plus constant exposure to oil and water vapors, and temperatures of 200°. Certified test results show a threefold increase in 1960 wiring harness life.



INCREASED FUEL PUMP RELIABILITY is an added benefit from Ford's submerged-type electric fuel pump. Certified results of dynamometer tests showed no vapor lock with Ford's electric pumps at temperatures up to 200°, whereas incipient vapor lock with mechanical fuel pump resulted in a power loss of 9% under same conditions.

It's a fact! Numerous reports from high-mileage operators of Super Duty Trucks attest to Ford's outstanding durability. Studies by an independent research firm provide certified proof that these models are even more durable for 1960.

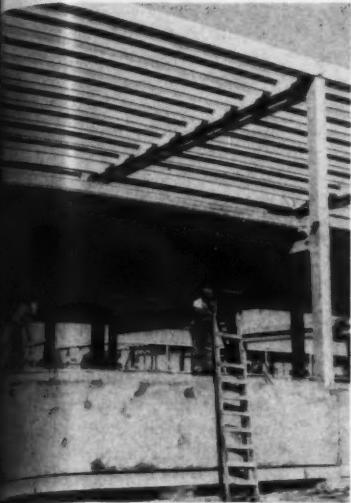
Ford Super Duty Trucks have earned a reputation for exceptional performance and durability since their introduction two years ago. Shop service records of many leading fleets show Super Duty tractors with mileage readings between 150,000 and 250,000 and no repairs other than normal maintenance. Similar testimony to the dependability of these Big V's by other satisfied users is being added each month. Is it any wonder that 50 sales of these units were more than double those of 1958?

And for 1960, the Ford Super Duties offer additional refinements. Bigger optional axles and increased GVW's to permit greater payloads and more profitable operation. Automatic radiator shutters to keep the engine temperatures within the most efficient operating range, improved submerged-type electric fuel pumps to prevent vapor lock, and redesigned wiring for more reliable operation are typical of the improvements to be found in these units.

The changes offered for 1960 were tested and evaluated by a leading research organization. Certified results of the studies by this impartial firm (name available on request) provide proof that Ford's Super Duty Trucks are even more dependable.

- **Certified Durability through closer temperature control!** Independent research engineers certify that Ford's thermostatically controlled radiator shutters kept water temperature between 167° and 187° in severe mountain grade operation. The test truck with shutters blocked open under same operating conditions had a temperature range from 102° to 181°. The temperature variation of only 20° with shutters means less expansion and contraction in block and heads. Higher, more constant temperatures permit oil to circulate more freely, reducing internal friction. All these factors contribute to longer engine life.
- **Certified Reliability with longer-lived electrical system!** Thicker insulation on wires resists deterioration by heat, oil and gasoline. Asphalt-impregnated loom and plastic-coated mounting clips protect against abrasion. Certified results prove that the 1960 wiring harness has three times longer life.
- **Certified Reliability with Ford's submerged-type electric fuel pump!** Dynamometer tests of engines with submerged-type electric fuel pump and conventional mechanical type showed that vapor lock was non-existent with Ford's electric pumps at temperatures up to 200°, whereas incipient vapor lock with mechanical pump resulted in a power loss of 9% at an underhood temperature of 200°.

Endurance tests were run on alternators, two-speed axle speedometer adapters and other related components with similar results. Get all the facts at your Ford Dealer's now!



Framing of the 2-story classroom buildings went fast. The prestressed grade beam is supported at each end by a poured-in-place caisson. The grade beam carries a 6-inch precast slab; final grade level will be at about the top of the slab. The 28-foot-high precast columns rise from the tops of the caissons to the prestressed-concrete roof beams, which support prestressed tees. The tees will carry the precast perlite slabs forming the roof.

were of an unusual design. An arrangement of steel plates, welded to the column steel, projected into the concrete haunch. The plates, rather than the concrete, took most of the load.

At another area on the site, a small but efficient crew turned out lightweight concrete planks for the roof deck. Containing a perlite aggregate, the 2x4-foot planks were cast one on top of another on a pallet. When the pallet was stacked 10 high with 120 planks, it was lifted by a crane and swung to the roof. Planks were 2½ inches thick and contained a wire mesh.

At convenient spots near the building, 6-inch concrete slabs were cast. These 6x27-foot slabs were later set to form walls of the crawl space.

Structure components

The precast columns, which are on 28-foot centers both ways, rise up from poured-in-place caissons to a height of about 28 feet. The caissons also support a lower grade beam that carries the 6-foot-high concrete slab enclosing the crawl space.

Floor beams, spanning 28 feet, rest on the column haunches. Continuous ledges, extending along each side of the beams, support the 2-foot-wide extruded floor planks. The planks, which are set side by side, received a 2-inch topping of concrete. Channels are also used in the floor. These normally are placed alongside a spandrel beam. The channels form a continuous void that can be used to carry ductwork or electrical wiring.

In the roof structure, single tees on 4-foot centers span the 28 feet between beams. The 2x4-foot lightweight concrete planks form the deck of the roof.



Perlite lightweight concrete roof slabs are cast one atop another to make a pallet of 120. Pallets of the 2x4-foot and 2½-inch-thick slabs are lifted to the roof by crane. Two Muller 6-cubic-foot mixers on the platform, background, supplied the concrete for the slabs.

Steel plates, cast in the base of the columns, aided erection. The rectangular plates, containing a hole at each corner, were set over anchor bolts in the caissons. Adjusting nuts, bearing on the base plate, set the column plumb. The column was then steadied with diagonal bracing to the ground and horizontal bracing to adjoining columns. Grout was placed in the gap between the base plate and the top of the caisson.

Setting in the beams and floor members was like putting up the logs in a cabin. As long as the pieces fitted, there was no strain. Very little welding was necessary, since most of the bearing points were concrete on concrete.

For Corbetta Construction Co., Mario Egidi was project manager. The job superintendent was Bob Stanton. The architect was represented on the job by Al Schramm.

THE END

B-E promotes engineer

Richard M. Reisel has been promoted to engineer in charge of the commercial crane and excavator division of the engineering department of Bucyrus-Erie Co., South Milwaukee. He was formerly small-machine design engineer for commercial crane excavators.

million Ford Super Duties!



"Our first Ford C-1000 tractor has logged 190,000 trouble-free miles since March of '58."

says Robey W. Estes, Vice President and General Manager of Estes Express Lines, Richmond, Va. "We haven't had a single road failure and we only bring it into the shop for regular preventive maintenance work once a month.

"We use the 477 engine and find oil consumption is exceedingly low... only one or two quarts added between 3000-mile oil changes.

FORD TRUCKS COST LESS

LESS TO OWN... LESS TO RUN... BUILT TO LAST LONGER, TOO!

Generally accepted accounting principles for contractors

Part 2: Income recording

In accordance with the long established accounting practice of anticipating losses (but not gains), it is recommended that when current estimates of total contract costs indicate a loss, provision should be made for the entire loss on the contract. This recommendation applies to both the percentage-of-completion method and the completed-contract method, even though the latter does not permit the recording of income prior to completion. However, as to both methods, the committee on accounting procedures of the American Institute of Certified Public Accountants holds the view:

If there is a close relationship between profitable and nonprofitable contracts, such as in the case of contracts that are parts of the same

project, the group may be treated as a unit in determining the need for a provision for losses.

This qualification is added when several contracts are parts of the same over-all project, they will be treated as a unit in estimating profits or losses. If this were done, revenues and costs relating to the same project might be recorded in different accounting periods.

Ordinarily, a provision for loss on a contract should not be necessary unless the total estimated direct contract costs are expected to exceed the total contract price, and the only to the extent that such costs exceed the contract price unless general and administrative expenses, a portion thereof, have been allocated to the contract costs under the completed-contract method. In the latter case, in determining the need for provision for loss, the total general and administrative expenses that are estimated will be incurred and allocated by the time of completion of the contract should be considered together with the estimated direct contract costs.

Penalty liabilities

In computing the need for provisions for losses on contracts, penalty liabilities for indicated late completion should be included in total estimated costs. When the contractor is working on a cost-plus basis, unreimbursable costs—be they unauthorized in themselves or amounts in excess of those authorized or in excess of "guaranteed maximum costs"—should be considered in determining whether the contract is a profitable or unprofitable one. Under some circumstances, consideration has to be given to such other factors as escalation, change-order extras, price redetermination, etc. On the other hand, incentive bonus provisions for early completion or for low cost should also be taken into account in determining the gain or loss status under contracts.

With the accrual basis of accounting, recognition is given to revenue, costs, and expenses, to the fullest extent possible in the periods to which they relate. As previously indicated, it is also, with the percentage-of-completion method, a generally accepted accounting procedure to accrue revenues under certain types of contracts on the basis of partial performance. This can be done if the circumstances are such that total costs and profits can be estimated with reasonable accuracy and ultimate realization is reasonably assured. With these principles and procedures in mind, the question is sometimes raised: Why not recognize the loss over the period of the contract? Assuming the exception commented on later is not applicable, it must be said that the accounting dogma of anticipating losses when they are reasonably determinable becomes dominant over the two above-mentioned principles. In brief, the entire loss accrues at the time when the current estimates of total contract costs indicate a loss, because such estimates indicate that the



summer in Arizona or winter in Maine—it's all the same to the new Joy RP-600

A 600 foot portable that can operate in desert heat . . . that's the Joy 600. A big cooler-radiator and a large slow-speed fan give the Joy 600 the largest cooling capacity available on any rotary. The RP-600 will operate continuously under full load in the hottest weather.

For cold weather operation, a series of by-pass valves in the cooling system assures adequate lubrication . . . even in sub-zero weather that would

keep other portable compressors shut down.

Other features that make the Joy RP-600 the most reliable machine on the market: Replaceable element oil filter . . . Automatic blowdown valve . . . Fail-safe safety circuit.

If you want compressor reliability in all kinds of weather, see your nearest Joy distributor and have him tell you about the complete line of Joy rotaries . . . sizes from 125 to 900 cfm.

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CONTRACTORS AND ENGINEERS

NOVEMBER,

will not be recoverable from future revenues on a contract or group of contracts relating to the same project. Such being the case, there is no merit in postponing the recording of portions of a loss to the future. The institute committee has taken a parallel position on the recognition of losses in its published bulletins dealing with such matters as inventory losses, losses on purchase and sale commitments, and unrealized losses on foreign exchange.

Renegotiation

Under some circumstances, government contracts and subcontracts are subject to renegotiation—that is, an adjustment of the original contract price with a refund payable to the government. Provisions for renegotiation refunds are similar to other provisions for foreseeable losses on contracts to the extent that when such probable refunds can be reasonably estimated, liability therefor should be recognized in the financial statements. The amount of refund recognized by the provisions should not, however, exceed that applicable to billings recognized as income to that date. Provision for such refunds should be included in the statement of financial position among current assets or liabilities.

When such refunds cannot be estimated, it should be disclosed that the contractor is unable to determine renegotiation effects, and that there are consequent uncertainties in the financial statements. Renegotiation provisions differ from other loss provisions in that they do not normally produce a contract loss but a reduction in previously anticipated profits. Renegotiation refunds involve only a refund of "excessive profits." The accounting treatment of such refunds in the income statement also differs from other loss provisions which are shown as contract costs. Provisions for renegotiation should preferably be treated in the income statement as a deduction from contract revenues.

This query has been made: If the completed-contract method (rather than the percentage-of-completion method) is selected as a result of a lack of dependable estimates of costs, are not the estimates equally unreliable for purposes of estimating an allowance for loss on a contract? The revision for a loss should represent, under either method, the best judgment that can be made in the circumstances. If "inherent hazards" are not present, it must be presumed that the completed-contract method is selected because there is no dependable estimate of costs. However, the selection and application of this method in accounting for the normal business operations of a contractor does not of itself preclude the fact that a loss will become clearly apparent at some stage of completion. To "expect," or to be reasonably certain that a loss will occur, a contractor must be presumed also to be in a position to approximate reasonably the amount of such a loss. The long established accounting practice of anticipating losses does

not recommend arbitrary provisions for losses, but presumes the exercise of care and good judgment.

Loss provisions

When provisions for estimated losses on uncompleted contracts are made on the books and in the financial statements, and such provisions are not currently deductible for income-tax purposes, it would be proper to make such provisions "net of taxes." That is to recognize (at the estimated effective tax rate) the future tax reduction at the time or times that the loss is deductible. If this were not done, the contractor's income would be improperly reduced in one accounting period by, say, an amount equivalent to half the total provision for loss. And the income

would be improperly increased in the subsequent accounting period, or periods, by the tax effect of the deduction of the loss in that period or periods. By providing for the loss "net of taxes," the estimated net loss (i.e., after taxes) is properly reported in the accounting period in which the loss is foreseen.

Loss provisions "net of taxes" presuppose that there is other taxable income or "carryback" privileges then available, at least to the extent of the deductible contract loss. Were this not so, the contract loss would produce no reduction in income taxes and should not then be recorded "net of taxes." It would not be proper accounting to anticipate future taxable income and, assuming a "carry forward loss," provide for contract

This is the second of four installments on accounting principles generally accepted by the accounting profession for use by contractors. The material, which is being published in booklet form by the American Institute of Certified Public Accountants, 270 Madison Ave., New York 16, N. Y., represents the thinking of the institute's committee on accounting procedures.

losses "net of taxes."

In computing the tax effect, the estimated rate should be based on rates in force during the period cov-

**220 H.P.
the most powerful —
42,000 LBS.
the heaviest.**

**GALION T-700
MOTOR GRADER**

the world's largest.

GRADE-O-MATIC features assure you UNMATCHED WORK CAPACITY.

- AUTOMATIC multiplication of torque (torque converter)
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This kind of power and control makes possible and practicable its 14' x 30" x 1" hydraulically shiftable moldboard — the most blade capacity ever built into a motor grader.

For new ease and accuracy in handling, you get Galion's combination manual with power booster steering. For ample traction and flotation, you have six 16.00 x 24, 12-ply, interchangeable tires.

The T-700 has the most improved steering mechanism, most efficient circle reverse, and most secure attachment of drive wheels to stub axles ever devised.

Its weight balanced to horsepower produces the tractive effort that gives you the most PUSH POWER at the blade, ever developed in a grader.

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The most beautiful steel bridges opened to traffic during 1958 have been chosen in the 31st annual bridge competition sponsored by the American Institute of Steel Construction. The Mackinac Bridge, Mackinac Straits, Mich., won the Class I award for bridges with spans of 400 feet or more. American Bridge Division



of U. S. Steel Corp. fabricated this bridge, cited for its "strength, handsome silhouette and beauty." The Class II award, for bridges with fixed spans under 400 feet and costing more than \$500,000, went to the Louie Morris Memorial Bridge over the Savannah River on U. S. 29, east

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*...and Barnes pumps
prime without fail!*

27 versatile models meet most construction needs—designed for any power source—deliver 2500 to 90,000 gph—available from one source of supply nearby!

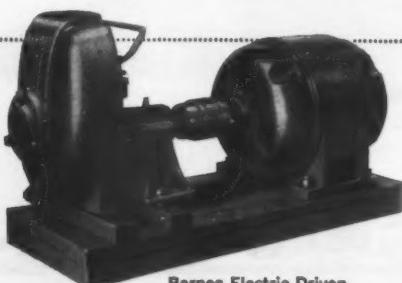
You get the ultimate in reliable self-priming when you standardize on Barnes Blue Ribbon Quality pumps!

Barnes exclusive self-priming principle for centrifugal pumps incorporates a free passage vent adjacent to the periphery of the impeller. It defies clogging. It primes without fail—even with as little as $\frac{1}{3}$ normal water level in the pump!

In your business, the chief test of any pump is in the years of continuous, low-cost operation it delivers. That is where Barnes self-primers stand out because every model is proved in our Blue Ribbon Quality Test Booth before entering the field! Ask your Barnes distributor for handy Construction Pump Selector #238—or write to us. Address Dept. B-119.



Barnes Manufacturing Co.
Mansfield, Ohio



Barnes Electric Driven
Centrifugal Pumps



Barnes Engine Driven
2 and 4 Wheeled Pumps



Specify Barnes Blue Ribbon Quality

...it pays off!

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5860-A

(Continued from preceding page)

ered by the income statement, with such changes as can be reasonably anticipated at the time the estimate is made. It is, of course, appropriate to consider the tax effect as the difference between the tax payable with and without including the loss as a reduction of taxable income. All significant income taxes, U. S. federal, foreign, state, and local, should be considered in the computation, and reasonable approximations in round figures will suffice.

Cost-plus contracts

Cost-plus contracts are commonly entered into by contractors. As earlier indicated, they are employed in a variety of forms, such as cost plus a percentage of cost, or cost plus a fixed fee. In the latter circumstance, defined costs may be limited and penalties made payable under guarantees, such as guaranteed maximum costs (or billings). When there are penalties, it is usual to provide as well for incentive or bonus payments.

Under cost-plus agreements, contractors usually are reimbursed at intervals for their expenditures and, in addition, are paid a specified fee. Payments on account of the fees (less "retainage," 10 per cent or another amount which is withheld until completion) are made from time to time as specified in the agreements, usually subject to the approval of the client's employees or an agent, such as the architect.

In most cases, the amount of each payment is, as a practical matter, determined by the ratio of costs incurred to total estimated costs. Cost-plus agreements often provide that ownership of all material vests in the client as soon as the contractor is reimbursed for his expenditures or, in some instances, immediately on receipt of the material by the contractor even though it is not yet paid for. In such instances, the contractor has a custodianship responsibility for these materials. Frequently, the client makes cash advances to provide working funds to the contractor, and often such sums are applied against the final payment due under the contract.

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CONTRACTORS AND ENGINEERS

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of each particular agreement
naturally influence the decisions.

Terminated contracts

For the convenience of the government, contracts may be terminated to adjust production for the military services, or contractor's clients may terminate their contracts for various reasons.

(Continued on next page)

of Hartwell, Ga. Calvert Iron Works, Inc. fabricated the bridge, which appealed to the judges because of its "athletic feeling combined with a sturdy rhythm." "A synthesis of the best in highway overpass design" won the Norwood Bridges over State Route 1, Providence Turnpike, Mass., the Class III award for bridges

with spans under 400 feet, costing under \$500,000. Fabricator of the structures is Tower Iron Works, Inc. The first honorable mention in Class II went to the South Fork Eel Bridge in Dyerville, Calif. Fabricator of the structure is Judson Pacific-Murphy Corp., Division of Yuba Consolidated Industries, Inc.



Geared by FULLER...

Davison's rigs move more payload in less time

J. K. Davison & Bro., Pittsburgh, one of the largest ready-mix purveyors in western Pennsylvania, is supplying concrete for the Steel City's gigantic new civic-sports arena.

To increase the capacity of their ready-mix fleet, Davison recently purchased two high-payload Diamond T trucks with 8-yard mixers, 212 hp engines, Fuller Model 5-A-65 5-speed Transmissions and Eaton-Hendrick-

son Model 38DS Tandem Rear Axles.

Selected because of their proven reliability and ease of operation, the Fuller 5-A-65 Transmissions help provide the proper gear ratios for high maneuverability on congested job sites as well as added flexibility in city traffic.

Davison's new trucks feature four-axle construction, permitting GVW of 60,000 pounds. Because chassis

weight has been held to 16,000 pounds, high payloads are possible . . . and because the Fuller 5-A-65 Transmissions permit the operator to select proper gearing for every situation, Davison is able to hustle more ready-mix to the job in less time.

There is a Fuller Transmission designed to put more profit in your operation. For details, contact your truck or equipment dealer.

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MANUFACTURING COMPANY
KALAMAZOO, MICHIGAN

Subsidiary EATON Manufacturing Company

Unit Drop Forge Div., Milwaukee 1, Wis. • Shaler Axle Co., Louisville, Ky. (Subsidiary) • Sales & Service, All Products, West. Dist. Branch, Oakland & Cal. and Southwest Dist. Office, Tulsa 3, Okla.
Automotive Products Company, Ltd., Brock House, Langham Street, London W.1, England, European Representative
For more facts, use Request Card at page 18 and circle No. 340

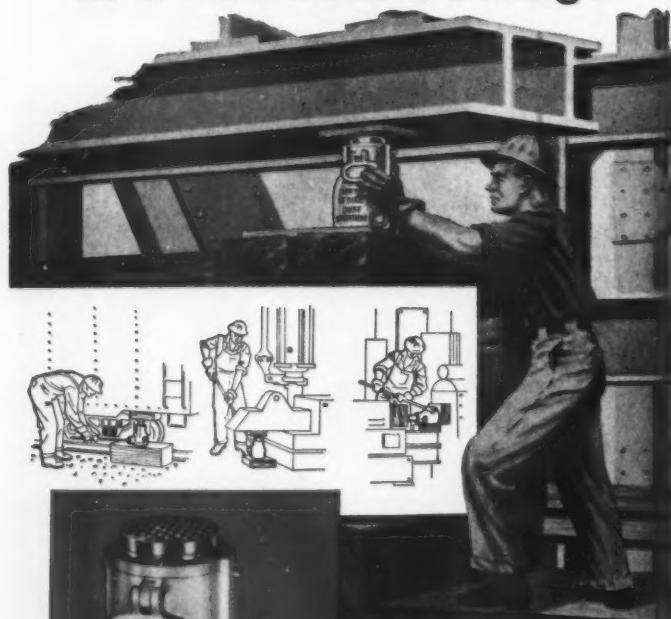


A first job in a program designed to prevent floods on the Marais Des Cygnes River involves preparing, at Ottawa, Kans., a trench for the lowering of a main sewer line across the river. This will clear the way for channel changes. A Manitowac Model 2000 hoe is handling trench excavation.



A bundle of reinforcing steel is lifted atop the Barren River bridge near Bowling Green, Ky., by a Bucyrus-Erie 30-B equipped with 70-foot boom and 20-foot jib. The 4-span steel and concrete bridge is part of a road development project on State Route 67.

200,000 Pounds Of Lifting Power In a 98 Pound Package



The 100 ton capacity Duff-Norton Aluminum Screw Jack weighs only 98 pounds. It is easier to handle and spot than any other type of jack of the same capacity which may weigh two to five times more.

Maintenance is virtually eliminated by the rugged construction—aluminum alloy housing and base—heat-treated steel lifting screw—sealed-in lifetime lubrication. This enables these jacks to withstand hard usage in any weather without damage.

The design of these jacks makes it impossible for them to creep—will support load indefinitely. They can be used in any position—have no fluid to leak—no air to lock. Duff-Norton Screw Jacks are ideal for heavy riggers or for construction and maintenance crews in shipyards, steel mills and other industries.

Duff-Norton Screw Jacks are available in 25, 35, 50 and 100 ton capacities in aluminum—in 15, 25, 35 and 50 ton capacities in malleable iron. For full details on these durable, all-purpose lifting jacks ask your distributor or write for Bulletin AD-12s.

DUFF-NORTON COMPANY

P. O. Box 1889 • Pittsburgh 30, Pennsylvania

COFFING HOIST DIVISION • Danville, Illinois

DUFF-NORTON JACKS

Ratchet • Screw
Hydraulic • Worm Gear



COFFING HOISTS

Ratchet Lever • Air
Hand Chain • Electric

For more facts, use Request Card at page 18 and circle No. 341

(Continued from preceding page)

business reasons. Thus, termination has the effect of converting an active contract in process of execution into a claim in process of liquidation or, from an accounting standpoint, into an account or claim receivable. Under ordinary circumstances, a termination claim should be classified as a current asset.

Under either a fixed-price or cost-plus contract, any remaining profit accrues as of the effective date of termination, not at the date of final settlement or some intermediate date. It will be observed that, from the viewpoint of timing, this accounting parallels recognition of foreseeable losses. The profits to be accrued should of course be estimable and realization thereof reasonably assured. Full disclosure should be made by footnote if determinate elements or items of known controversial nature exist and estimates are not practicable.

While the total claim, and particularly the profit allowance, is subject

to negotiation, termination articles provide for a formula settlement allowing definite percentages of profit based on costs in the event of the failure of negotiations. Such articles thus fix a minimum profit allowance. Under most circumstances, a contractor may accrue the minimum profit allowance determined by the formula when he is otherwise unable to determine a more appropriate profit allowance.

Retention of material

Items retained by the contractor as scrap or for his own use or for resale "scrap market." These items to outsiders should be properly valued and deducted from the contractor's termination receivable. Such retainals in some instances may be extremely expensive, such significance that a contractor may make a so-called "no-cost" settlement, in which case no termination claim is made and no profit accrued until the future disposition of the retained items.

The primary basis for property

4



Facts about IGAS JOINT SEALER

- 1 . . . **VERSATILITY:** This tough, non-meltable black or gray compound will adhere to any construction material in vertical, horizontal and overhead joints.
- 2 . . . **STABILITY:** Igas remains flexible over a wide temperature range. It will not sag or flow in hot weather. It will not become brittle in cold weather.
- 3 . . . **DURABILITY:** Even after years of exposure, Igas will not lose its effectiveness. Containing no solvent, it will not dry out nor shrink.
- 4 . . . **RESISTANCE:** Igas resists sewage, salts, non-oxidizing acids, dilute acids and sea water. It is non-toxic.

For all the facts, write for Bulletin IS-59



SIKA CHEMICAL CORPORATION

MAIN OFFICES: Passaic, N.J.; Distributors and dealers in principal cities; Affiliates around the world.

For more facts, use Request Card at page 18 and circle No. 342



bridge near Sunbury, Ohio, is widened by rebuilding the shoulders and 0-foot boom them. Trucks in the background are delivering the No. 6 chips used with a road asphalt in the surface treatment for the road. The Huber-Warco 10-ton 3-ton compactor is rolling the chips into the asphalt.

Items retained by a contractor is cost. In principle, cost means on articles sum of expenditures directly or tlement already incurred in bringing an items of productive to its existing condition and extent of the item. A departure from this basis such article pricing is required, however, when allowance for utility of the goods is no longer made, a contract as great as its cost.

minimum often this may be the case to a a minimum amount indicated by the contractor on the occasion of a term-wise unavailability when some items may cease appropriate have any utility value other than

use. The recognition of a lower value in the utility of goods is generally

accomplished by stating them at a lower level commonly designated as "market value."

The accounting rule, "cost market whichever is lower," provides, therefore, a means for measuring the residual usefulness of an item. Such reduction in cost may be due to an expenditure. The term "contractor's market" means current replacement cost" settled by purchase or reproduction.

In applying these rules, judgment must be exercised and losses should be recognized unless there is clear evidence that a loss has been sustained. For example, replacement

or reproduction prices would not be appropriate when the estimated sales value, reduced by costs of completion and disposal, is lower. Furthermore, where the evidence indicates that cost will be recovered with an approximate normal profit on sale, no loss should be recognized, even though replacement or reproduction costs are lower.

Subcontractor's claims

The claims of subcontractors can pose problems in the event of a contract termination. Frequently, the contractor has no control over the filing of subcontractors' claims and may not know their amount until some time after the termination date. If the amounts of claims of subcontractors are not reasonably determinable, this should be disclosed by footnote in the contractor's financial statements.

There is also the possibility that the contractor may suffer loss through his failure to recover the full amount of his liability on subcontractors' claims. Foreseeable losses of

this character should be provided for, just as other contract losses are provided for.

The institute committee on accounting procedure considered either of two alternative methods of presenting subcontractors' claims acceptable in the financial statements of a contractor, since both methods meet the test of adequate disclosure. On the one hand, recoverable subcontractors' claims may be considered to be in the nature of contingent liabilities with an offsetting contin-

gent asset in the form of the termination claim. These offsetting amounts may, as no loss is expected, be omitted from the contractor's financial statements and their existence disclosed by footnote. As an alternative method, subcontractors' claims may be recorded in the contractor's statement of financial position as current liabilities, and the amounts recoverable by the contractor may be included in his termination claim receivable in such statements.

THE END

"THE SHEAVES THE THING"

Unretouched photograph. Section cut from a Flame-Hardened McKissick sheave . . . etched 2½ min. ammonium persulfate.

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Groove form . . . proper line support. Gently rounded lips prevent line chaffing when fleet angles etc. are present.

CONSIDER:

Completely machined grooving to proper line size. Always in perfect wind.

CONSIDER:

Dense martensitic structure. Clearly outlined by the $(NH_4)_2S_2O_8$ etch . . . hard surface (450-500 Brinell) in the wear area of the sheave. Always presents a smooth uncorrugated properly sized groove face.

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DIRECT OR ALTERNATING CURRENT
Hobbs dc Hour Meter tells when lubrication and other service functions are due on any equipment powered by an internal combustion engine, gasoline or diesel. Hobbs a-c Hour Meter has a wide range of applications on any equipment powered by line current.

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ENGIN

NER, 1959

Construction Camera



Sand for an earth dam at Clinton, Okla., is pushed to a washing plant at the construction site by an International TD-24. Foss Dam, a \$7 million project, will be 134 feet high and have a crest length of 18,200 feet. A total of 10,600,000 yards of material will go into the structure.



Backfilling for an 18-inch storm-sewer drainage line is done by a Model HO Payloader with Drott 4-in-1 bucket during work on the widening of State Route 4 in Paramus, N.J. About 3,500 linear feet of highway was widened 14 feet on each side to make a 6-lane route.

**DRILLED MORE
THAN 100 HOLES
in Hard Concrete
WITHOUT
RESHARPENING"(*)**

**IMPOSSIBLE with steel
star drills! ROUTINE with the
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Most economical bit you can use in any electric or pneumatic hammer! Drills in any masonry from brick to granite. Does the work of 16 star drills. And it's a one-man operation! Exclusive combination of vertical and spiral flutes provides positive dust removal... no packing, stalling, or binding. Tops in economy and efficiency on every job. Sizes: $\frac{3}{8}$ " to $1\frac{1}{2}$ " diameter. Extended lengths up to 18". Send for free drilling manual.

Other New England Carbide-Tipped Bits Include:

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104

New parts, service post for Motorola subsidiary

■ Motorola Communications & Electronics, Inc., has appointed Willis Ditmanson its national parts and service manager. The company is a wholly owned sales and service subsidiary of Motorola, Inc., Chicago.

In this new post, Ditmanson will coordinate on a national scale the Motorola Communications Service Organization, which provides contract maintenance and other service aids

to users of mobile radio and other communications networks.

Ditmanson continues to direct operations of the company's national parts department, which serves parts depots in the United States and abroad.

Charles Herrin has been named sales manager for the 10-state Western area. He will have headquarters in Burlingame, Calif.

R. G. LeTourneau places steel on open market

■ R. G. LeTourneau, Inc., Longview, Texas, is now offering its Steel Division products to the open market. This will permit southern industry to have an additional supply of high-quality steel plate. The steel is available to meet ASTM and AISI specifications and includes such types as mild, firebox, low-alloy high-tensile alloy, and special alloys.

James R. Anderson has been employed to assist in handling the needs of steel sales customers.

Esso Standard assigns

■ F. William Schumacher, manager of the Everett, Mass., refinery of Esso Standard Oil Co., has been named to the new post of petroleum-research coordinator at Esso headquarters in New York City. William J. Sheridan, operations superintendent at the company's Bayway Refinery, Linden, N.J., succeeds Schumacher at Everett, Mass.

BOOST PRODUCTION...cut downtime with WISCONSIN-POWERED equipment!

POWR-FACTOR, a vibratory compactor made by Maginniss Power Tool Co., Mansfield, Ohio, assures uniform density in sub-base — saves mortar and concrete. This powerful lightweight relies on a single-cylinder ACH Wisconsin engine for power.



HOT OR COLD PATCH material is mixed on the job by the mobile patch mixer made by K. E. McConaughay, Lafayette, Ind. Vaporizing coil-type mixer-burner with fuel pump is powered by a 2-cylinder 15-hp Model TH Wisconsin heavy-duty air-cooled engine.



AUTOMATIC CURING MACHINE, with adjustable spray head, sprays curing mixture over concrete surface in one pass. Made by Chain Belt Co., Milwaukee, Wis., the unit is powered by a 2-cylinder 15-hp Model TH Wisconsin heavy-duty air-cooled engine.



You pay for workhours — not manhours — when you use Wisconsin-powered equipment on your construction jobs. That's because Wisconsin engines minimize power shutdowns — keep men and machines busy around the clock, regardless of weather.

Wisconsin engines outwork and outlast other engines of their type and size. They start fast — deliver steady load-lugging power that shrugs off the effects of sudden shock loads.

Air-cooling cuts engine size and weight — eliminates up to 26 parts used on water-cooled engines. You don't have to worry about summer dry-ups or winter freeze-ups, anti-freeze, fan belts, clogged radiators, etc.

Leading builders include Wisconsin heavy-duty, air-cooled engines on their mechanized equipment by choice — not by chance. For the many dollars-and-sense benefits, specify Wisconsin engines on the equipment you buy. Sizes from 3 to 56 hp. All models can be equipped with electric starting. Write for Bulletin S-237.



WISCONSIN MOTOR CORPORATION
MILWAUKEE 46, WISCONSIN

World's Largest Builders of Heavy-Duty Air-Cooled Engines

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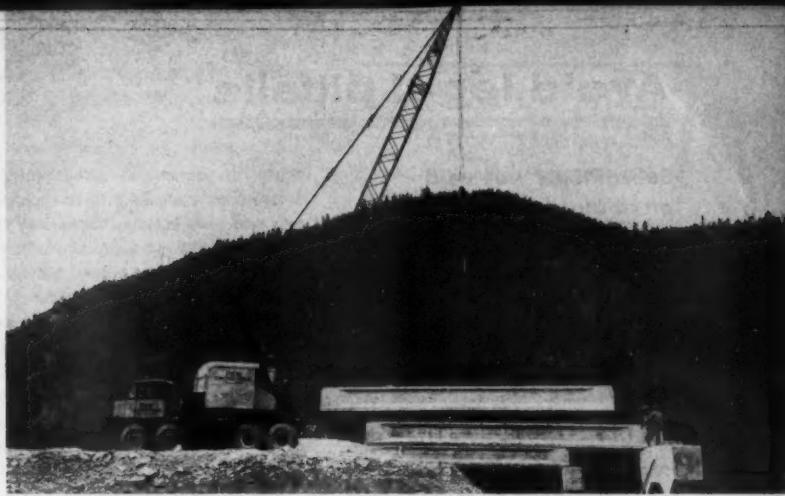
Write for free demonstration. There's a PM Field Engineer near you.

Pacific Mercury
13232 Leadwell
North Hollywood 4, Calif.
Manufacturers of the Thomas Electronic Corp.

For more facts, circle No. 347
CONTRACTORS AND ENGINEERS



Composite construction for the Bruckner Expressway in the Bronx, New York City, calls for more than 265,000 Nelson shear connector studs to be end-welded to the girders. When concrete is placed, studs will bind concrete and steel together for composite action. The technique saved about 15 per cent in steel on this job.



A highway-over-highway overpass at the junction of U.S. 10 and Interstate 90 near Tarkio, Mont., is constructed with girders of prestressed concrete. The Lorain 35-ton crane lifts a 10½-ton girder for the bridge. Two overpasses will be built here, requiring a total of 36 girders 40 feet long and 12 girders 45 feet long.

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3314 Cherry Lane, Fort Wayne, Indiana

For more facts, circle No. 348
NOVEMBER, 1959

Maintenance, operation conference by Iowa Mfg.

Iowa Mfg. Co., Cedar Rapids, Iowa, will hold its annual Cedarapids Maintenance and Operation Conference in January, 1960. The conference will be divided into three sessions: January 11 through 15 on aggregate-producing equipment, for contractors and producers; January 18 through 22 on bituminous mixing and paving equipment, for contractors and producers; and January 25 through 29, service school for Cedarapids dealers and service personnel.

White Motor division appoints manager

William L. Peterson has been appointed manager of the Philadelphia branch of White Truck Division of The White Motor Co., Cleveland. Formerly director of sales engineering, Peterson will now be in charge of sales, parts, and service for White and Autocar trucks in the Philadelphia area.

ONE POUR

forms walls and footings

Contractors save time and labor with the new EFCO Spread Footing Forms. When assembled with regular EFCO Forms, both footings and walls may be poured at the same time. A big advantage!

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Des Moines, Iowa

Please send literature on EFCO Footing Forms, and address of nearest sales office (there are 28 coast-to-coast):

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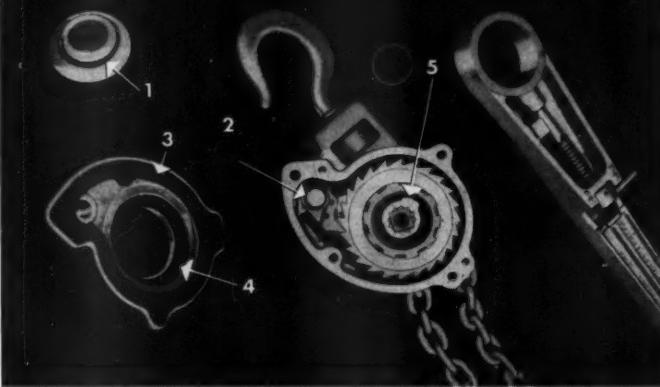
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NEW Coffing SEALED Safety Pull Ratchet Lever Hoist

Five Seals Assure Efficient Hoisting In Any Weather



Here is a new hoist designed for safe, efficient hoisting in any weather. Loads will not slip because the brake mechanism of the Safety Pull Hoist is permanently sealed in five places against moisture, oils, chemicals and dirt—all common causes of hoist slippage.

The spring-loaded Neoprene seals assure that brake performance will remain constant under all exposure conditions. Another advantage of the sealed brake is that it will not freeze or lock—it is always free to lower even after accidental overload.

Safety features include the exclusive Safety Handle which bends to

indicate overload. The free chain control is protected so that it will not accidentally trip.

The Safety Pull Hoist is easy to operate. The handle pull to lift rated load requires minimum effort. Load spotting is precise to within a fraction of an inch. Up and down controls are away from operator's hand so he can use shorter leverage for greater speed with light loads. Ball bearing swivel load hook and plated chain are additional features.

Five models, $\frac{1}{4}$, $1\frac{1}{2}$, 3, $4\frac{1}{2}$ and 6-ton capacities are available. For additional information ask your distributor or write for Bulletin ADH-78.

COFFING HOIST

DIVISION OF
DUFF-NORTON COMPANY

810 Walter Street • Danville, Illinois

COFFING HOISTS
Ratchet Lever • Air
Hand Chain • Electric



DUFF-NORTON JACKS
Ratchet • Screw
Hydraulic • Worm Gear

For more facts, use Request Card at page 15 and circle No. 350

Avoid legal pitfalls

Subcontract was void on at least one ground

THE PROBLEM: A California state parkway contract required the contractors to perform, with their own organization and with the assistance of workmen under their immediate superintendence, work of a value of not less than 50 per cent of the value of all work embraced in the contract. Consent of the director of public works to subletting was required. A subcontract involving 44.4 per cent of all the prime contract work was reported to the director. But an agreement by the subcontractors, for

rental of equipment to the contractors though appearing to be separate, was really an inseparable part of the subcontract. That made the subcontract overrun the 50 per cent limit. The subcontractors constituted a partnership, but only one of the two members was licensed as a contractor. The firm sued the prime contractors and their surety for money earned under the subcontract in furnishing equipment and work. Was the suit properly dismissed?

THE ANSWER: Yes. (Lewis & Queen v. N. B. Ball Sons, 297 Pac. 2d 120, decided by the California District Court of Appeal.)

There was a double defense: (1) that the subcontract was void because violative of the subletting clause of the prime contract, and (2) because only one member of the subcontracting firm was licensed. Concluding that the second defense was clearly valid, the Court of Appeal found it unnecessary to pass upon the first defense.

The court did not say whether or not the prime contractors were right in their contention that the specification in the prime contract against subletting more than 50 per cent of the work was a declaration of "public policy" and that any agreement to circumvent it was unlawful.

But the court could see no escape from the fact that as the plaintiff partnership did not have a contrac-

tor's license, it could not sue.

The case involved application of California statutes which make it unlawful for any "person" to engage in construction contracting without a license; forbid suit to recover compensation without alleging and proving that he was licensed; and define "person" as being "an individual, firm, co-partnership, corporation, association, or other organization, or any combination of any thereof."

The court cited a decision to the same effect that had been rendered by the California Supreme Court in a case where a building contracting partnership was denied right to collect for private construction because only one member was licensed.

In any state where there are statutes to the same effect, it is doubtful that even if all members of a firm are individually licensed, a contract made by the firm can be enforced if the firm is not licensed as such.

Equipment mortgages

THE PROBLEM: Was a recorded chattel mortgage covering a piece of equipment invalid as against a third party because the description of the equipment did not include the serial number?

THE ANSWER: No. (Phillips v. J. F. Johnson Lumber Co., 147 Atl. 2d 843, decided by the Maryland Court of Appeals.)

The court said that the description was sufficient because it described the equipment as being owned by the mortgagors, located in a designated county, and by the make, type, and model set forth in the mortgage. This was sufficient to enable a third party to identify the piece of equipment which was the only one of its kind owned by the mortgagors. But had the serial number been inserted, a lawsuit might have been averted.

Vague airfield contract

THE PROBLEM: Under a prime contract for resurfacing, regrading, and storm drainage of an airfield, the prime contractor reserved certain work and subcontracted for installation of the drainage system. The subcontractor in those areas where pipes were laid under paved runways or taxiways was obligated to backfill until all reached the top of subgrade, with remainder of trench to be backfilled with sand shell. Was it the duty of the prime contractor to fill space formerly occupied by a paved slab, which was removed to cut the trench and was not part of the contract for installation of the drainage system?

THE ANSWER: Yes. (Rea Construction Co. v. B. B. McCormick & Sons Inc., 255 Fed. 2d 257, decided by the United States Court of Appeals, Fifth Circuit.)

The court said that the written contract was ambiguous as to the intent of the parties on the point involved, thereby leaving it open to each party to the suit to show by oral testimony the true intent of both parties. The court said that there was evidence to support the subcontractor's version of the understanding.



"Hardrock Smitty" says: — Get the job done

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- **EFFICIENTLY**
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SMITH 125 AIR COMPRESSOR

Rugged construction, smooth performance . . . in an Air Compressor designed to stand up under the "toughest" job conditions. The SMITH 125 operates on a 6-cylinder, instant-starting Hercules Industrial engine—using 3 cylinders for power, 3 for compression. It will satisfactorily operate two 85-pound paving breakers at the same time. Tested and proved to be the most dependable, inexpensive to operate and maintain Air Compressor available, the SMITH 125 will give years of efficient service.

Compare the price . . . compare the job results—you'll find it's profitable to "GO SMITH" with "Hardrock Smitty"

Write us for the name of your nearest dealer and for complete information about the 125 and other models, portable and stationary.

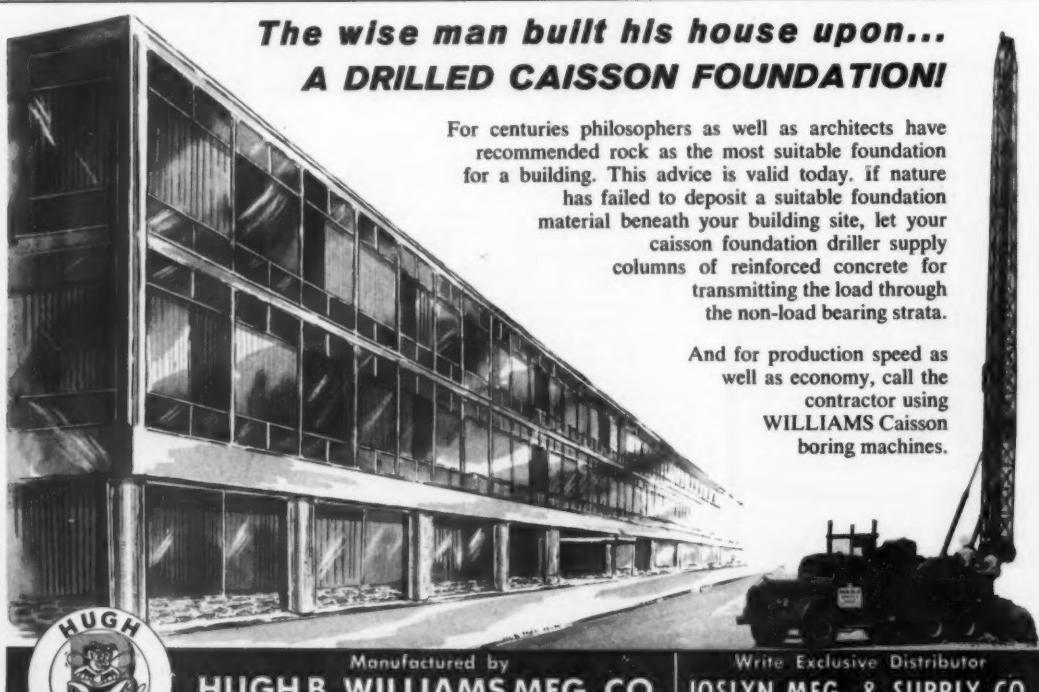
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AIR COMPRESSORS

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The wise man built his house upon... A DRILLED CAISSON FOUNDATION!



For centuries philosophers as well as architects have recommended rock as the most suitable foundation for a building. This advice is valid today. If nature has failed to deposit a suitable foundation material beneath your building site, let your caisson foundation driller supply columns of reinforced concrete for transmitting the load through the non-load bearing strata.

And for production speed as well as economy, call the contractor using WILLIAMS Caisson boring machines.



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Write Exclusive Distributor
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for DESCRIPTIVE LITERATURE

Trespassing child hurt

THE PROBLEM: A 10-year-old girl was injured when she fell while walking upon uncovered floor joists in a building under construction. Was the contractor liable on a theory that he who maintains a dangerous condition peculiarly attractive to trespassing children must take suitable precautions to safeguard such juvenile trespassers?

THE ANSWER: No. (Miller v. Guernsey Construction Co., 112 So. 2d 55, decided by the Florida District Court of Appeals, Third District.)

The court cited judicial decisions showing that appellate courts throughout the country have decided

that a building in process of construction cannot be regarded as an "attractive nuisance."

An extensive summary of decisions pro and con on this particular subject will be found in 44 Am. Law Reports 2d, pages 1253-1265.

Lowest bid was ignored

THE PROBLEM: A municipal housing board rejected the lowest bid for construction of a low-rent housing project, basing its decision upon an affidavit of a plumber expressing unwillingness to work for the bidder, upon hearsay testimony, and upon the fact that litigation had arisen in a prior project. Was an award of the

contract to the next lowest bidder valid as being the exercise of sound discretion?

THE ANSWER: No. (Pittman Construction Co. v. Housing Authority of Opelousas, 187 Fed. Supp. 517, decided by the United States District Court, Western District of Louisiana.)

Under Louisiana law, an unsuccessful bidder on a contract, advertised by a public board to be let to lowest responsible bidder, may sue to set aside the award.

The statute providing for proper letting of public contracts for public works is a prohibitory law founded on public policy, and a contract in violation thereof is wholly illegal.

The word "shall," as used in a

Edited by A. L. H. STREET Attorney-at-Law

These brief extracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt, consult your own attorney.

public-works statute requiring that public work be let to the lowest responsible bidder, is mandatory and gives but little discretion in determination of the lowest responsible bidder. The word "shall" is ordinarily imperative, of similar effect and import with the word "must," and in-



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New General Electric Transistorized Progress Line

General Electric's new Transistorized Progress Line will fit in more places, in more different positions, than any other two-way mobile radio you can buy today.

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TPL is the first two-way radio that transmits up to 75 watts of power in high band . . . the first that really fits under the dash . . . the first to realize the full benefits of transistorized design (no more than four tubes) . . . the first to eliminate bulky cables through new one-piece design of receiver control and transmitter . . . the first with shielded dirt-free ventilation.

The new General Electric TPL ushers in a new era of convenience and reliability in mobile communications. Don't miss all the exciting details. Write General Electric Company, Communication Products Department, Section 30119, Mountain View Road, Lynchburg, Virginia.



GENERAL  **ELECTRIC**

Communication Products Department

For more facts, use Request Card at page 18 and circle No. 353

avoid legal pitfalls

consistent with the idea of discretion.

The Louisiana Public Works statute does not permit rejection of the lowest responsible bidder, who has bid on public work according to contract documents, and the award of contract to a higher bidder. The governing board has discretion to determine who are and who are not responsible bidders, but that determination must not only be honest but must be based on sound and good evidence, and the same standards should be applied by

the board equally to all bidders.

The responsibility of a bidder is to be determined not alone by his financial ability to perform the work but also by his experience and reputation for satisfactory work of equal importance.

Dwelling units to be constructed for a local housing authority constituted "public work" to be done by a "public corporation" within the Louisiana public-works statute requiring that contract be let to the lowest responsible bidder.

An unsuccessful low bidder on a housing project was entitled to sue to enjoin award of contract which

had been awarded to a higher bidder contrary to the statute. But the court could do no more than declare the contract void and could not require award of contract to the lowest bidder, since the housing authority retained power either to award contract to the lowest responsible bidder or to reject all bids and readvertise.

Haulage contractor hurt

THE PROBLEM: In hauling gravel in his own truck under arrangements that made him an independent contractor, and not the employee of a prime contractor, plaintiff was in-

jured, allegedly due to negligence of the contractor's employee, who was operating another truck. The contractor made a payment to plaintiff on a theory that plaintiff was his employee and so was covered by the workmen's compensation law. Plaintiff barred from suing the contractor for damages in view of the fact that no employee-employer relationship existed between them?

THE ANSWER: No. (Holcomb v. Bullock, 91 N.W. 2d 869, decided by the Michigan Supreme Court.)

The court said that, because plaintiff was not an employee, he had no right to choose to accept workmen's compensation, and his initial but erroneous supposition that the accident was covered by the workmen's compensation act was not binding upon him.

Third-party rights under contracts

THE PROBLEM: A state contracted with two railroad companies for the elimination of grade crossings on a highway. These contracts required the performance of various steps by the state and by the railroad companies before the project could be completed. The state awarded the construction contract to plaintiff contractor. Allegedly, the contractor was damaged because of neglect by the railroad companies to perform their part of the work in sequence and in accordance with their contract with the state. Did the fact that no direct contract relationship existed between the contractor and the railroad companies prevent the contractor from holding the two railroad companies liable?

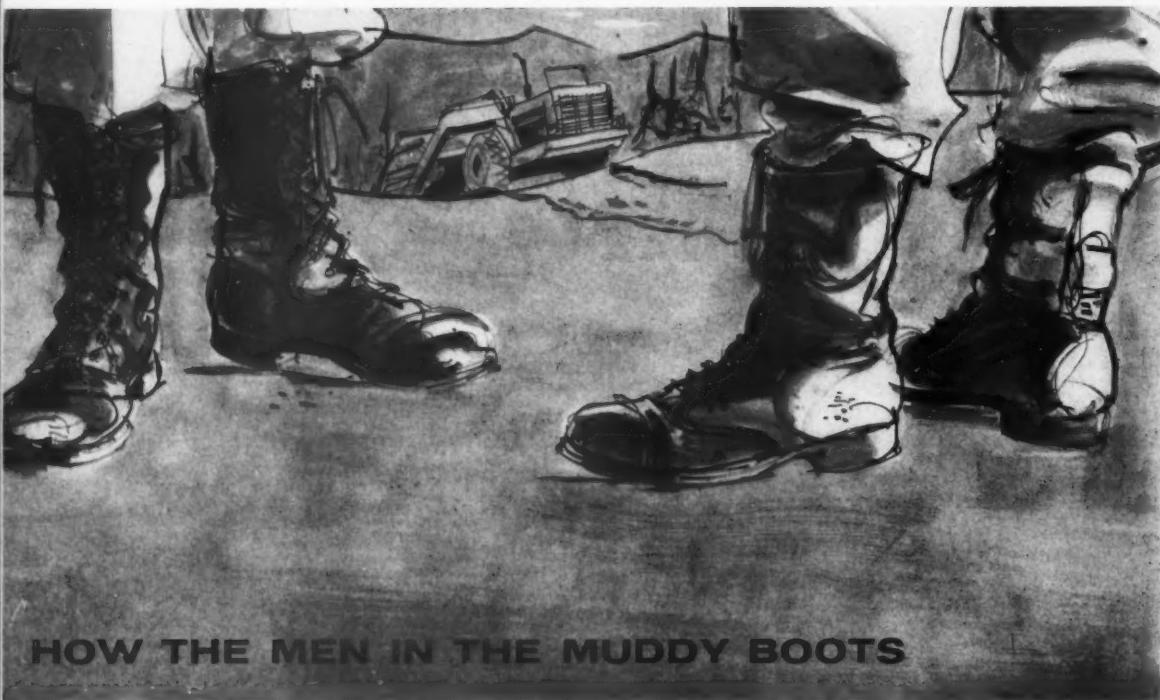
THE ANSWER: No. (Visintine & Company v. New York, Chicago & St. Louis Railroad Co., 155 N.E. 2d 622.)

The Court decided that although the contractor was not a formal party to the contract between the state and the railroad companies, it was entitled to hold the railroads liable for such damages as resulted from failure to comply with their agreement with the state.

Right to arbitration

THE PROBLEM: A prime contractor had a contract in writing with a city for construction of a sewerage system. The contract called for arbitrating disputes between city and contractor. The contractor sublet a portion of work and entered into written agreement, providing that subcontractor would comply with all the terms and conditions pertaining to his part of the work and would furnish a surety bond guaranteeing completion in accordance with the terms and specifications of the agreement and of the contract between the city and contractor pertaining to the subcontracted portion of work. Did the subcontractor bind himself to arbitrate disputes with the prime contractor arising under the subcontract?

THE ANSWER: No. (Seale v. Roy M. Mitchell Contracting Co., 321 S.W. 2d 149, decided by the Texas Court of Civil Appeals, Austin.)



HOW THE MEN IN THE MUDDY BOOTS

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Construction job sites make the noisiest editorial offices on Earth. But 40 years in the construction business have taught CONTRACTORS AND ENGINEERS that the job site is the *best* place to *learn* the facts about a project—and that construction men learn *most*, learn *best* from the industry magazine with the project point of view.

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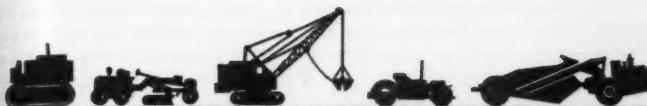


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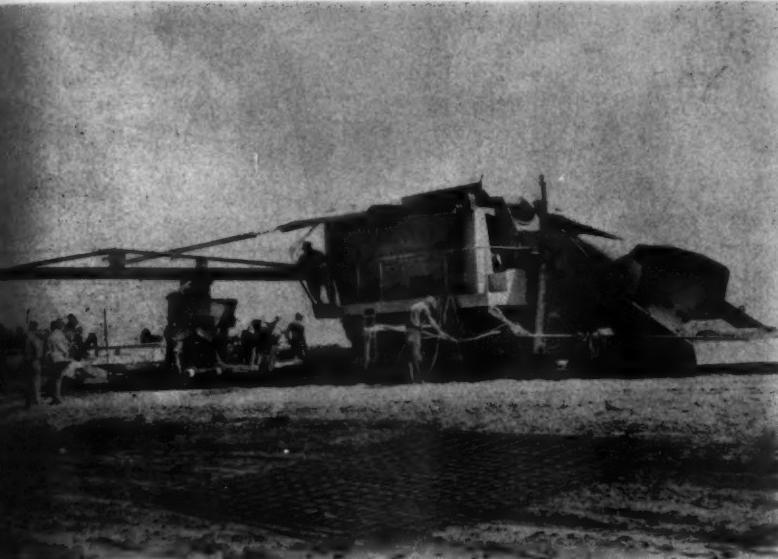
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For further information on any of the literature described in the following section, circle the designated number on the Request Card at page 18.

PRODUCT PARADE



Huge-capacity paver mixes concrete, places half mile of highway per day



A paver large enough to place approximately 250 linear feet of standard 2-lane highway per hour is offered by the Koehring Division, Koehring Co. Called the Tribatch Model 34-E, it uses a 3-compartment drum for mixing aggregate, cement, and water.

Despite the increase in capacity and operating functions, the machine is said to be actually easier and simpler to operate. This is due to the Koehring Batchmeter, an electric automatic control of all the mixing-cycle functions, including raising of the skip, introduction of the water, and operation of the transfer chutes and discharge chute. Safety devices prevent one function from taking over until all preceding functions have been fully carried out, according to the manufacturer.

The Tribatch paver is also equipped with a new precision pressure-injection water system that greatly increases the speed at which water is introduced into the mixing drum and at the same time measures with extreme accuracy the amount of water furnished. A safety device prevents the skip from being raised until released by the man directing batch trucks.

For further information write to the Koehring Division, Koehring Co., Dept. C&E, 3026 W. Concordia Ave., Milwaukee 16, Wis., or use the Request Card at page 18. Circle No. 115.

Announce the addition of a new, powerful crawler to diesel tractor line

The new International TD-25 diesel tractor, the most powerful crawler ever produced by the International Harvester Co., is available in either a torque-converter or gear-drive version. Both models are powered by the company's DT-817 turbocharged engine—a 6-cylinder 4-cycle direct-starting engine developing 230 net horsepower at the flywheel at 1,500 rpm.

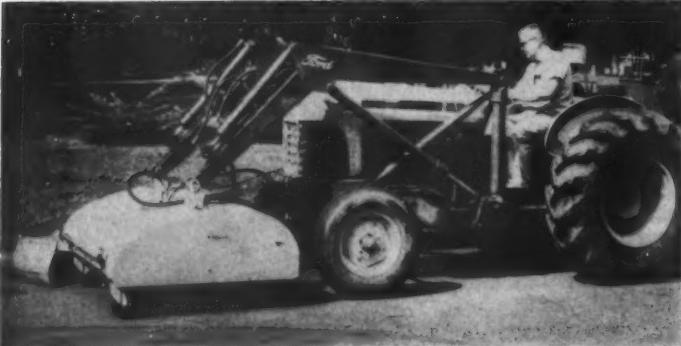
Four speeds forward and reverse are offered by the torque-converter model, which has a drawbar pull up to 70,000 pounds at .75 mph, with adequate weight and traction. Operating weight is 46,000 pounds.

The gear-drive TD-25, with an operating weight of 45,500 pounds, has a 46,700-pound drawbar pull in first gear at rated governed speed. It has eight speeds forward and reverse.

Both models feature the I-H Planet-Power system, said to permit turning with controlled power on both tracks with effortless, fingertip steering. Planet-Power also provides instant power shifting from one speed range to the next.

For further information write to the International Harvester Co., Dept. C&E, 180 N. Michigan Ave., Chicago 1, Ill., or use the Request Card at page 18. Circle No. 116.





The Model 594 is interchangeable with the loader bucket of all popular tractor-mounted front-end loaders.

Attachment for loaders sweeps, picks up, loads

The Mars Equipment Co., Inc., announces a pick-up sweeper that also loads. Designated Model 594, this unit is interchangeable with the loader bucket of all popular tractor-mounted front-end loaders. It can be attached or detached in minutes and needs no extra valve or plumbing. Dirt is swept into the pan, and loader arms lift the sweeper to dump directly into a truck or container.

The brush is driven hydraulically from the loader pump. Standard parts are used throughout to simplify maintenance, states the company.

Offered as optional equipment are a gutter brush for sweeping gutters or close to buildings, a sprinkler system to control dust, and broom extension arms for use on certain loader models where more clearance is needed or more reach is desired.

For further information write to the Mars Equipment Co., Inc., Dept. C&E, 5209 W. Broadway, Minneapolis 22, Minn., or use the Request Card at page 18. Circle No. 32.



Additive announced for concrete blocks

A new plasticizer, for use in molding concrete blocks and shapes, is announced by N. D. K. Laboratories. Called plasticizer No. 4, it is an additive used in conjunction with aggregate at the time of mixing.

According to the manufacturer, plasticizer No. 4 makes blocks virtually waterproof, thereby promoting their shedding qualities when exposed to rain or melting snow. The use of plasticizer No. 4 is also said to result in better binding qualities for the aggregate.

This additive is sold in concentrated form, in 55-gallon steel drums. To use, it is diluted with water and added to aggregate in the mixer.

For further information write to N. D. K. Laboratories, Dept. C&E, 6912 W. Cedar St., Milwaukee 13, Wis., or use the Request Card at page 18. Circle No. 85.

To obtain further information on any of the products described in this section, circle the number given at the end of the item on the Request Card at page 18.

Field welding unit has ac-dc welder, ac power

A new gasoline-engine-driven combustion arc welder and power unit, designed especially as a source of power for tungsten-inert-gas-shielded arc welding in the field where normal power is not available, is announced by the Hobart Bros. Co.

The unit has only one engine and one generator, yet it provides current for either ac or dc welding. It is rated at 250 amp, 30 volts for dc welding, and 300 amp, 30 volts for ac welding.

on a 100 per cent duty cycle.

As a welder-power combination, the unit can also be used as a source of single-phase 110/220-volt ac power of 10-kw capacity (up to 3 kw available while welding). One-kw 110-volt dc auxiliary power is also available while welding.

For further information write to the Hobart Bros. Co., Dept. C&E, Hobart Square, Troy, Ohio, or use the card at page 18. Circle No. 102.

PACAL

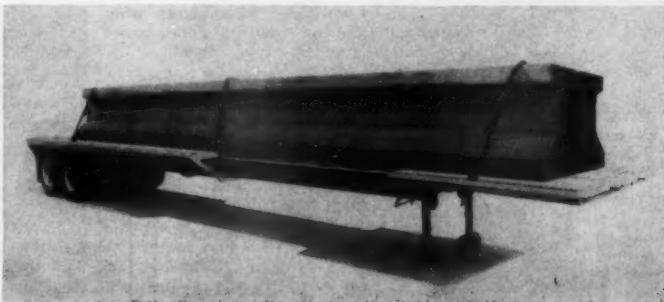
You can see it's Pacal
T.M. Reg. U.S. Pat. Off.

Buy Pacal Heat Treated Plow Bolts, too. They have triple strength and hardness. They will not loosen or stretch and heads will not wear off. Especially developed to provide the longer wear required by Pacal X-TRA-EDGE BLADES.

Also available
7/8" heavy duty section
with 5/8" top

PAPER, CALMENSON and Company

Specially designed for handling prestressed beams, stacks, booms, reinforcing bars, and other long objects, this trailer is available from the Rogers Bros. Corp. The normal length of the 8-foot-wide unit is 35 feet, but it can be extended to 55 feet. Designated Expando, the unit is available in alloy steel or a new special type of steel said to have increased carrying capacity in proportion to weight. For further information write to the Rogers Bros. Corp., Dept. C&E, 108 Orchard St., Albion, Pa., or use the Request Card at page 18. Circle No. 50.



Portable engine generator is rated at 2,500 watts

The Wincharger Corp. has available a new Winco Lite portable engine generator. This plant is rated



at 2,500 watts but is said to develop up to 3,000 watts ac intermittent power. It weighs 123 pounds.

According to the manufacturer, the Winco Lite offers full power from one 115 or 230-volt outlet. Regularly equipped with a carrying handle, the unit is also available with stationary base, a Speedy Shift 2-wheel dolly, or carrying cradle.

For further information write to the Wincharger Corp., Dept. C&E, Insurance Bldg., Sioux City 2, Iowa, or use the Request Card at page 18. Circle No. 27.

BLADES

The popular choice

County Highway Official, Iowa— "After one year's use new Pacal blades have saved our county 40 to 50% in blade and bolt costs."



County Highway Engineer, Iowa— "Special hardened blades very satisfactory here. Switching to this three-piece arrangement 100%."



County Highway Official, Minnesota— "380 hours on machine before blades were worn out."

County Highway Superintendent, Indiana— "Results very good... getting 4 times the wear over old $\frac{1}{4}$ " x 6" double bevel curved-blades."



County Highway Official, Iowa— "Very pleased with new three-piece blade... receiving four times the wear of blades previously used."



State Highway Engineer— "Have used 15 sets of $\frac{1}{2}$ " to $\frac{3}{4}$ " x 8" blades. They wear very straight and 50-60% longer than $\frac{1}{2}$ " x 8" blades."

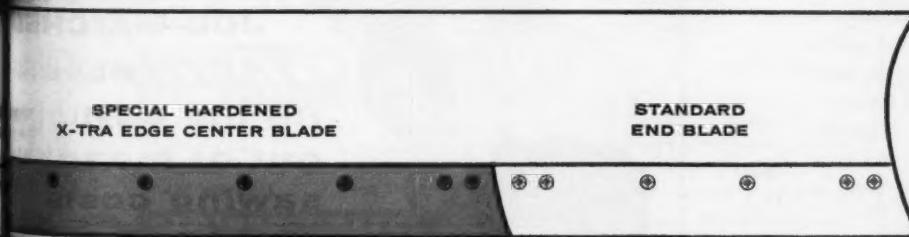
County Highway Official, Missouri— "Pacal $\frac{1}{2}$ " to $\frac{3}{4}$ " x 8" special hardened blades giving about 3 times more wear than $\frac{1}{4}$ " x 6" blades."



County Highway Superintendent, Ill.— "Using $\frac{1}{2}$ " to $\frac{3}{4}$ " x 8" blades and know they outlast 5 to 6 pairs of $\frac{1}{2}$ " x 6" double bevel curved blades."



City Street Commissioner, Missouri— "Three-piece $\frac{1}{2}$ " to $\frac{3}{4}$ " x 8" hardened blade wearing 5 to 6 times as long as $\frac{1}{2}$ " x 6" double bevel curved blade."



Profile of Pacal X-TRA-EDGE BLADE shows how you can get more steel on the wearing edge with no increase in waste. New Pacal hardened center section resists crowning, makes your blades wear two to six times longer, cutting blade costs even more. Join the number of satisfied users—write or call Pacal!

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FOR CONCRETE TESTING by highway departments, colleges and contractors



THE MOLINE TEST MOLD

You can produce accurate test specimens to exact measurements with Moline Molds. They meet all ASTM requirements and are virtually indestructible—because they are made of refined malleable iron. Portable for laboratory or field work. Eight sizes available including standard 6" x 12" Model A (illustrated). REMEMBER — A TEST IS ONLY AS GOOD AS THE SPECIMEN. Prices, sizes and delivery data on request.

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80 Years of Service

For more facts, circle No. 355

The International Harvester T-340, fitted with the Drott 4-in-1 front-end loader, performs backfilling operations close to a foundation.

BIG 16-TON TILT TRAILER

Automatic "Easy Up-Easy Down" hydraulic tilt deck only 33" high. Deck gently tilts to low load angle. Walking beam pivots on Timkin Bearings. No skids or blocks needed. Just the rig for D-4, D-5, TD-9, OD-12, pavers, and other loads. Exclusive breakdown-proof rear deck channel mounting.



Professionally Engineered
— ONE-MAN OPERATION —
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Extra strong frame. Wiring enclosed. Other models 3 ton and up.

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For more facts, use Request Card at page 18 and circle No. 356

BRADEN WINCHES



what capacity winch do you need?

BRADEN Truck Winches are designed to save you hundreds of man hours every year no matter what kind of handling jobs you need to have done. Dependable BRADEN Winches are available for any truck — large or small. Capacities range from 6,000 lbs. to 100,000 lbs., and there are standard models for front end or back of cab mounting.

BRADEN models are also available for special applications, and engineering assistance is provided to help you with any winch problems.

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BRADEN WINCH COMPANY
P.O. Box 547, Broken Arrow, Oklahoma



"In Service Around the World"

For more facts, use Request Card at page 18 and circle No. 357



Versatile new tractor announced by Harvester

The International T-340—a new 31-drawbar-horsepower crawler tractor designed primarily for industrial and commercial use—is announced by International Harvester.

Weighing 5,600 pounds, the unit is designed for a wide variety of earthmoving and material-handling jobs: earthmoving close to foundations, building construction on hillsides and crowded areas, and projects on uncertain or muddy terrain. It will handle many items of ground equipment including International Wagner backhoes, loaders, blades, and I-H dozers. The International Drott 4-in-1 skid shovel—a front-end loader that duplicates the actions of four specialized machines—also has been adapted for use with the new machine. The new Drott unit features a $\frac{3}{4}$ -yard SAE rating.

The tractor is powered by a 4-cylinder gasoline engine with 135-cubic-inch displacement.

Equipped with clutch-disk-brake planetary steering, the crawler has 5 speeds forward, one in reverse, and

a speed range of 1.5 to 5.9 mph.

The Model T-340 is available with independent power takeoff, as well as internally mounted or engine-drive hydraulic-pump hydraulic system. It will also handle most trail-behind or 3-point hitch equipment.

When ordered with torque-amplifier drive, the tractor has 10 speed forward, two in each forward gear, and two in reverse. Speed in any gear is cut one-third by simply pulling the "TA" lever.

For loading operations, the crawler can be fitted with Harvester's fast-reverser attachment, which permits it to change direction without shifting of transmission gears. The attachment enables the operator to back away in any gear at speeds approximately 25 per cent faster than the machine moves forward.

For further information write to the International Harvester Co., Div. C&E, 180 N. Michigan Ave., Chicago Ill., or use the Request Card at page 18, Circle No. 59.



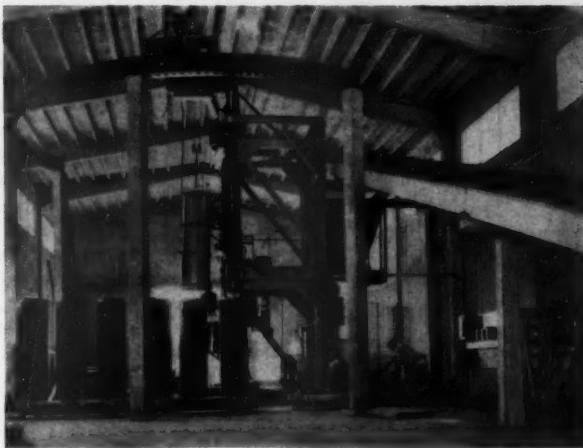
ASK FOR ON-THE-JOB PROOF

For more facts, use Request Card at page 18 and circle No. 358

CONTRACTORS AND ENGINEERS



A unique circular crane services concrete-pipe casting operations at the plant of the Fountain Sand & Gravel Co., Pueblo, Colo. The 6-ton-capacity circular crane and hoist was manufactured by the Wright Hoist Division, American Chain & Cable Co., Inc. When the concrete mixture is properly cured, the carts are moved into position and another operator uses the hoist and crane unit to lift the form from the pipe section and move it under the mixing chamber to accept additional concrete. The hoist unit, operating from a power supply source of 240-volt 60-cycle 3-phase current, is of ample capacity to handle any size of concrete pipe made by Fountain Sand. A conveyor belt, to the right, is utilized by this fabricator to supply the bin hopper with all the aggregate of the mix. For further information write to the American Chain & Cable Co., Inc., Dept. C&E, 929 Connecticut Ave., Bridgeport 2, Conn., or use the Request Card at page 18. Circle No. 66.



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MAKE UP YOUR OWN HERC-ALLOY SLINGS. No more waiting for new or repaired assemblies to reach you from the factory.

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- Stronger than Herc-Alloy chain
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IN ALL WINTER WORK...INSIDE-OUTSIDE...USE

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SALAMANDERS LP GAS 4 MODELS

FEATURES

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TYPICAL USES: DRYING PAINT AND PLASTER...CURING CONCRETE...WORKER'S COMFORT...HEATING WAREHOUSES, SHANTIES, SHEDS AND MATERIALS.

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THE MOST COMPLETE LINE OF PORTABLE HEATERS WITH CAPACITIES UP TO 150,000 BTU PER HOUR, BOTH MANUAL AND AUTOMATIC OPERATION. PRICES \$19.50 AND UP

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For more facts, circle No. 360

Safety hats and caps have improved design

The SuperGlas safety hats and caps manufactured by The Fibre-Metal Products Co. offer substantially improved safety and weathering characteristics.



The new safety feature is a single injection-molded polyethylene suspension unit that has both a fixed safety factor, with a 1 1/4-inch clearance from the crown of the hat or cap, and an additional adjustable clearance laced to fit the individual user. The polyethylene suspension is interchangeable in all styles of Fibre-Metal hats and caps.

For further information write to The Fibre-Metal Products Co., Dept. C&E, Fifth and Tilghman Sts., Chester, Pa., or use the Request Card at page 18. Circle No. 109.

New photocopier is fully automatic

Haloil Xerox Inc. offers the Model 914 photocopier.

Fully automatic, the unit does not require sensitized or treated papers nor any exposure or developing adjustments. The desired number of copies may be made by simply setting a dial. There is no need to handle the copy paper or to rehandle the original for the multiple copies.

The Xerox 914 copies all colors and rapidly prints finished, permanent copies of any written, drawn, typed, or printed document up to 9x14 inches in size. The machine also permits copying from bound books or magazines as easily as from individual documents.

For further information write to Haloil Xerox Inc., Dept. C&E, 2-20 Haloil St., Rochester 3, N. Y., or use the Request Card at page 18. Circle No. 47.

SAVE MONEY... USE TRIMIX* TO SPEED WINTER CONCRETE AND MORTAR WORK

*ONLY TRIMIX CONTAINS DYNEX®—to reduce water requirement, prevent efflorescence, yield stronger, denser mortar or concrete...high early strength permits earlier removal of wall forms and finishing of floor slabs.

TRIMIX GIVES COLD WEATHER PROTECTION—Its "anti-freeze" action helps prevent damage to mortar and concrete and enables work to continue throughout winter.

EASIER WORKABILITY — Reduces labor costs by faster placing and easier handling...SAVES UP TO 30% ON FINISHING COSTS!

TRIMIX SAVES TIME, LABOR AND MONEY!

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Building Products Division, Department C-119
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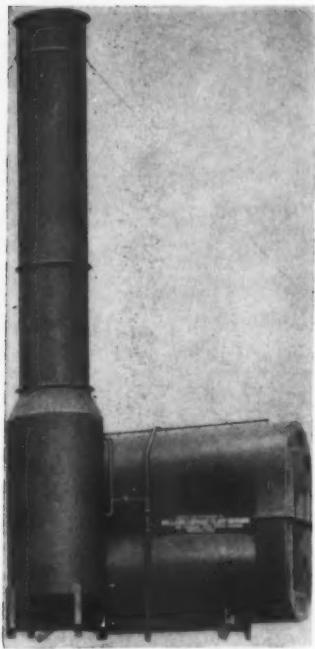
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COMPANY.....

ADDRESS.....

CITY..... ZONE..... STATE.....

For more facts, use coupon or circle No. 361



Asphalt plants now in violation of local air-pollution codes can supplement their primary dust collectors with the new Bollard dust washer for the desired result. It can be added to any make of asphalt plant or dry primary collector. The unit is available in three models and can be mounted at grade or on elevating support structure. The manufacturer provides specialized engineering services for each individual installation. For further information write to the Bollard Asphalt Plant Division, The Colonial Iron Works Co., Dept. C&E, 17625 St. Clair Ave., Cleveland, Ohio, or use the Request Card at page 18. Circle No. 29.

New casting forms cut stripping time

New Form-Crete all-steel casting forms, said to substantially reduce the amount of time required for form stripping and resetting, are available from the Food Machinery & Chemical Corp. Included in the group of new forms are the single-tee slab form and new piling forms equipped with a unique form-lock system.

The single tee is equipped with a toggle lock assembly that allows the producer to quickly swing the side forms away from the cast product for easy stripping and allows resetting of the forms in a minimum of time.

The form-lock system, used on square piling, channel slab, and other straight-sided forms, also minimizes stripping and resetting time. When the form lock is engaged on these forms, it forces the sides of the form into a true perpendicular position ready for the placing of the concrete. After the concrete is set, the form locks are released, and the natural flexing of the metal at the base of the form pulls its sides away from the concrete, thus allowing easy removal of the product.

For further information write to the Food Machinery & Chemical Corp., Florida Division, Dept. C&E, P. O. Box 1718, Lakeland, Fla., or use the Request Card at page 18. Circle No. 114.

Aluminum diaphragm pump offered in two models

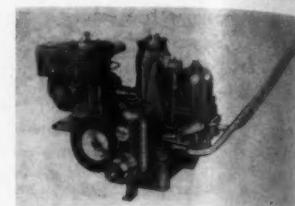
Marlow Pumps, division of Bell & Gossett Co., announces two new aluminum diaphragm pumps. An electric-motor unit is known as Model 302B-EL, while a gasoline-engine unit is designated Model 302B-1.

Both units have 3-inch male-threaded suction and discharge. They use standard diaphragms and have replaceable rubber flapper valves. Either model is available as a base

or wheel-mounted unit.

The electric-motor-driven model has capacities up to 71 gpm at 56 strokes per minute. The Model 302B-1, with a Briggs & Stratton engine, has a capacity of 76 gpm at 60 strokes per minute, using a governed engine speed of 1,850 rpm. Both models utilize an oil-lubricated gear drive.

For further information write to



Marlow Pumps, division of Bell & Gossett Co., Dept. C&E, P. O. Box 200, Midland Park, N. J., or use the Request Card that is bound in at page 18. Circle No. 24.

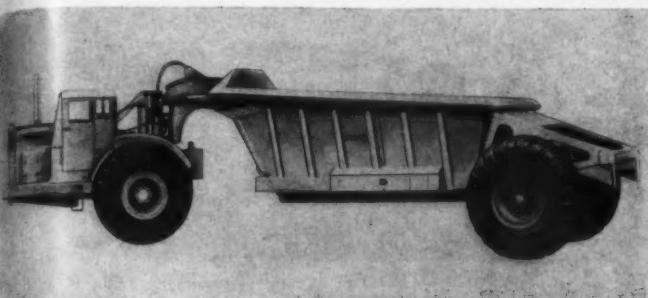


PROJECT PAYDIRT* pays off again...

NEW CAT D7 SERIES RA



*PROJECT PAYDIRT: Caterpillar's multimillion-dollar research development program to meet the continuous challenge of the construction era in history with the most productive earthmoving machines ever developed.



A hydraulically actuated mechanism locks the PW21's three doors, eliminating road spillage.

Bottom-dump trailer has 35-ton capacity

The Athey Products Corp. announces a new 35-ton-capacity bottom-dump trailer for use with the Caterpillar DW21 tractor.

Called the PW21, the unit has a third, or rear, door in addition to two 3-foot-wide bottom doors. This third door, together with steep side plate angles (18 degrees off vertical) and a 5-foot rear clearance, permits the machine to dump instantly with

no "hang up" and to ride out over the dumped load.

Another feature of the machine is the hydraulically actuated door mechanism. Doors can be opened instantly or slowly for spread dumping.

The PW21-DW21 team offers speeds up to 27.9 mph and will make non-stop turns in 40 feet.

For further information write to the Athey Products Corp., Dept. C&E, 5631 W. 65th St., Chicago 38, Ill., or use the Request Card at page 18. Circle No. 46.

Tire spreader available for maintenance shops

The Branick heavy-duty Ef-Ert-Less tire spreader is designed to lift, engage, and spread ply and wire cord tires up to 14.00×24, 20-ply, with the added advantage of a completely air-operated tire lift that raises tires from floor to spreader arms at the touch of a valve handle.



The unit quickly and easily spreads the tire for installing and removing inside curing rims, air bags, tubes, and flaps, as well as for inspection and repair.

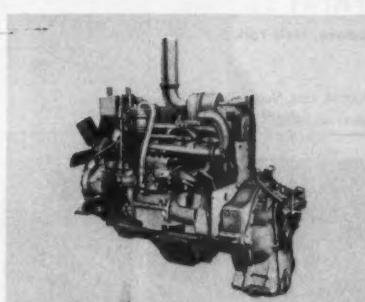
For further information write to the Branick Mfg. Co., Dept. C&E, 2600 Third Ave. N., Fargo, N. Dak., or use the Request Card at page 18. Circle No. 16.

Hardfacing electrode for general-purpose use

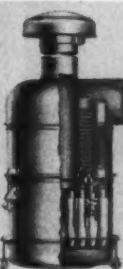
A new, manual, tubed electrode for general-purpose hardfacing is available from the American Manganese Steel Division of the American Brake Shoe Co.

Designated Amsco 53, the rod is easy to handle and features a stable, low-spatter arc with optimum speed and build-up. Specially alloyed for use where both impact and abrasion are a problem, it is recommended for crusher rolls, hammermills, scraper blades, dipper teeth, etc.

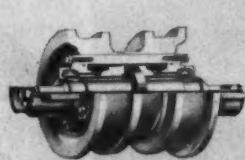
For further information write to the American Manganese Steel Division, American Brake Shoe Co., Dept. C&E, 395 E. 14th St., Chicago Heights, Ill., or use the Request Card at page 18. Circle No. 23.



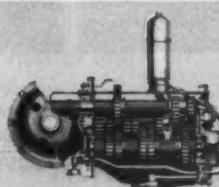
NEW TURBOCHARGED ENGINE. 140 flywheel horsepower... 112 drawbar horsepower make the new D7 even more productive. In-seat starting is available as an attachment. And in addition to the 9% horsepower increase, the new Turbocharged Cat Engine offers 80% more tractor lugging ability. The payoff: greater capacity to lug against big loads without stalling—for higher production, greater operating economy.



NEW DRY-TYPE AIR CLEANER. Pioneered by Caterpillar, this new dry-type air cleaner uses cyclone tubes and cellulose filter element to remove at least 99.8% of all dirt and dust from engine intake air—during every operating hour, even under the most severe operating conditions. Filter element can be cleaned and re-used. Cleaner can be serviced in 5 minutes. The payoff: longer engine life, greater economy, less maintenance.



SERVICE-FREE TRACK ROLLERS. New lifetime lubricated track rollers, carrier rollers and idlers on the undercarriage are protected by exclusive Caterpillar floating-ring seals. They need no lubrication until rebuilding, eliminate on-the-job roller lubrication. In addition, track roller life is increased by improved load-carrying design. The payoff: greater economy, longer life, less maintenance.



PRESSURE-LUBRICATED TRANSMISSION. Transmission, bevel gear and pinion are now pressure lubricated with full-flow filtered oil, another development of Caterpillar's research program Project Paydirt. And new power train components, provided to transmit greater horsepower, feature a major increase in strength in the final drive gears. The payoff: longer lived gears and bearings for trouble-free operation.

CATERPILLAR TRACTOR

PAYOFF FOR YOU: MORE PRODUCTION AT LOWER OPERATING COST THAN EVER BEFORE!

In comparison the new Cat D7 Series D Tractor is the best in its class. It packs 140 horsepower... with 80% more lugging ability than the model for greater production. And it does production with lower operating and maintenance costs. The payoff is increased money-making performance on your job—performance that no other in its power range can match!

Major improvements, developed by Caterpillar's Paydirt, account for the increased capacity of D7. These improvements affect the engine, main and undercarriage. They're explained in the right.

Along with the new features, the best of the tested features of the Series C model have been retained. One of many examples: the exclusive dual oil clutch, which delivers up to 2,000 hours per season—without adjustment!

For complete facts about the leader in this class, see your Caterpillar Dealer. He's ready to give you the story about the new D7 Series D, as well as the achievements of Project Paydirt. He'll be glad to demonstrate, too, for this D7 really shines—in action. See him and where—he'll be there!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

BORN OF RESEARCH
PROVED IN THE FIELD

ENGINEERED MATERIALS & EQUIPMENT FOR EVERY PRESTRESSED OPERATION

Now you can obtain a full line of engineered materials and equipment for your prestressed operation from a single supplier—Intercontinental Equipment Co.

You'll find we provide fast delivery, competitive prices, and highest quality for the sale or rental of the material and equipment listed at the right.

For a free copy of our products catalogue, or engineering assistance on prestressing material or equipment, just write or phone:

- jacks—pumps
- Ter-Con bearing pads
- Herculite—nylon curing tarps
- strand anchorages
- post-tensioning components



INTERCONTINENTAL EQUIPMENT CO., INC.

Prestressed Concrete Division • 120 Broadway, New York 5, N.Y.

Be sure to visit our Booth — No. 3 — at the P.C.I. Convention in Miami, November 1-7.

For more facts, use Request Card at page 18 and circle No. 363

Product Parade



The package consists of ten Cleveland RC-30 portable electric vibrators, with mounting brackets, and a portable mounted control panel center for all vibrator control. All ten vibrators are plugged into the portable control panel, supplied by an outside power line.

Vibrator package for prestress work

The Cleveland Vibrator Co. has introduced a new portable package vibrator control system for the prestressed-concrete industry.

The individual vibrators, which are secured to the form with two bolts, can be mounted and unmouned in minutes. Mounting brackets are welded to the forms, and the vibrators are easily slipped in and out.

The combination of portable external vibrators and a control buggy gives maximum flexibility. Vibrators can be shifted from form to form rapidly and easily.

The vibrators are totally enclosed providing protection for rough usage. The RC-30 weighs only 48 pounds and will develop up to 1,100 pounds of impact at 3,600 vibrations per minute.

For further information write to The Cleveland Vibrator Co., Dept. C&E, 2828 Clinton Ave., Cleveland 13, Ohio, or use the Request Card at page 18. Circle No. 14.

For more facts on these products, circle the indicated number on the Request Card at page 18.

Steam cleaner features simplicity of operation

The Aerol Products Co., Inc., announces a new 600-gallon-per-hour steam cleaner.

Designed for heavy-duty use, the Model CLS-600 features simplicity of operation. The unit has a down-draft burner and a 15,000-volt transformer to provide constant ignition.

It features a chemical bypass system: cleaning chemicals bypass the heating coil, permitting use of less expensive compounds and preventing coil-clogging problems.

Two cleaning guns and one rinsing gun are provided as standard equipment.

For further information write to Aerol Products Co., Inc., Dept. C&E, 6 Wesley St., South Hackensack, N.J., or use the Request Card at page 18. Circle No. 30.

CONTRACTORS AND ENGINEERS



CITY STREETS



PLAYGROUNDS



SERVICE STATIONS



PARKING LOTS



HIGHWAYS



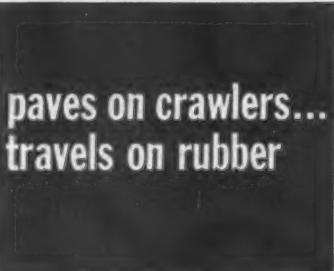
HIGHWAY SHOULDERS



DRIVEWAYS



ALLEYS



paves on crawlers... travels on rubber



Here's the only asphalt finisher that paves on crawlers and travels on its own hydraulically retractable pneumatic tires. Write for new bulletin describing such exclusive Barber-Greene features as automatic tamping, leveling and thickness controls . . . new, hydraulically folding hopper . . . simplified controls with single-stick steering.

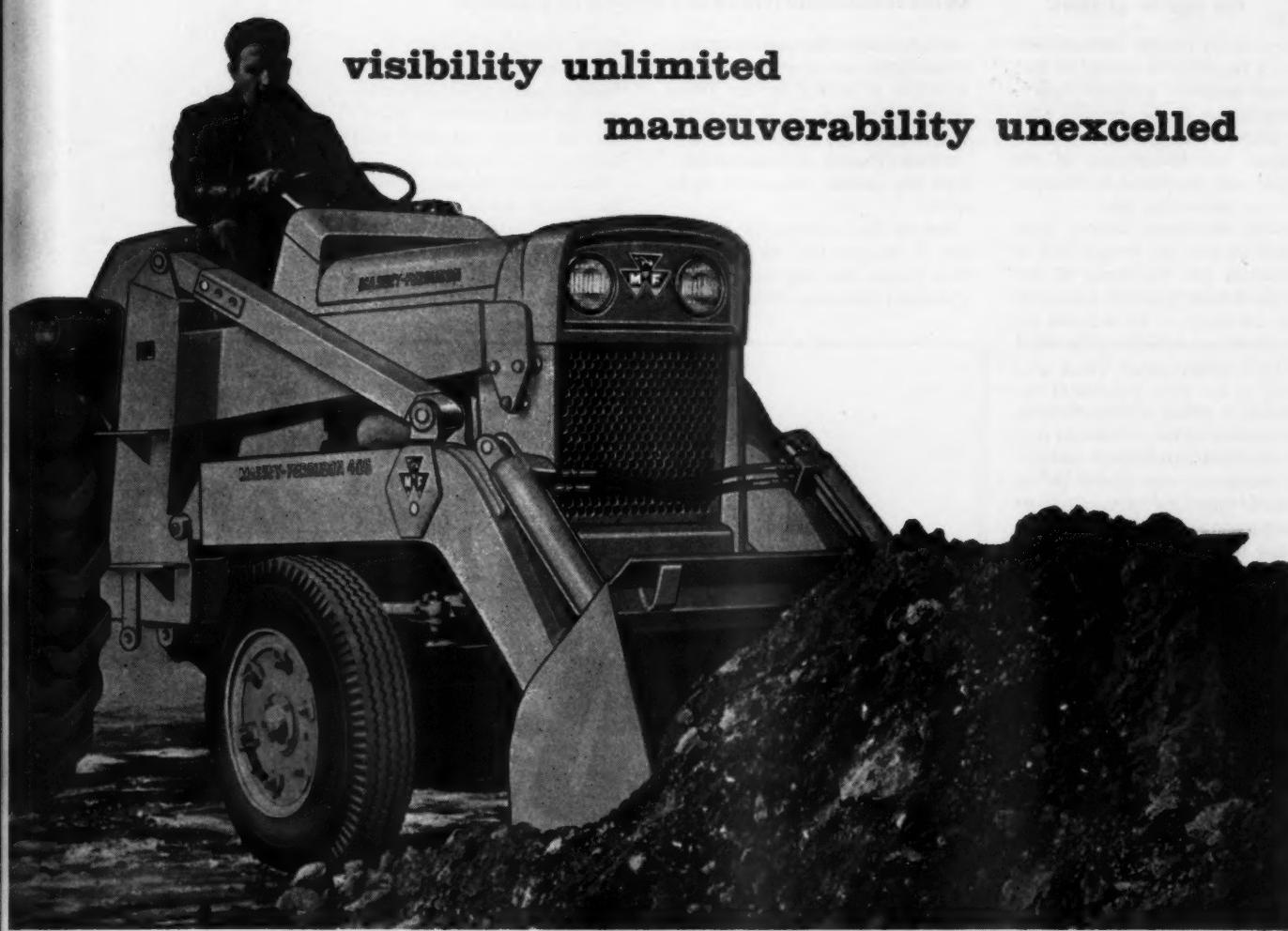
Barber-Greene 
AURORA, ILLINOIS, U.S.A.

CONVEYORS... LOADERS... DITCHERS... ASPHALT PAVING EQUIPMENT

For more facts, use Request Card at page 18 and circle No. 364

visibility unlimited

maneuverability unexcelled



new MASSEY-FERGUSON 406 **the BIG CHANGE in tractor shovels**

Have loading power at your finger tips... speed and directional control at a touch of your toe... and see wherever you go — that's why this all-new, streamlined Massey-Ferguson 406 is the BIG CHANGE in tractor shovels.

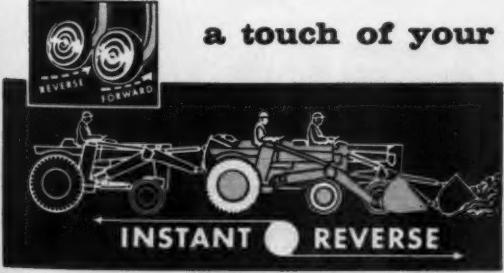
Instant Reversing, all-around visibility, full 1 cu. yd. bucket, lets you get more loads, bigger loads, and outperform larger, more expensive machines. And, you can handle the precision, utility jobs more efficiently and economically. Low-thrust point, high reach, multitude of integrated attachments including the famous Davis Backhoe make it the most versatile, profit-producing rig in its class.

IT'S WORTH BUYING!

For a real eye-opener, let your Massey-Ferguson Industrial Dealer demonstrate this "years ahead" tractor shovel for you. Write for his name and illustrated literature.



a touch of your toe—away you go—forward or reverse



**MASSEY-FERGUSON
INDUSTRIAL DIVISION**

Block 1000 South West Street • Wichita 13N, Kansas

For more facts, use Request Card at page 18 and circle No. 365

Product Parade



Offer new anchors for use in girders

Anchors to provide restraint and spacing for deflected strands in prestressed structural members, and to permit release of the restraint after the concrete has attained sufficient strength for detensioning of the strands, are announced by Superior Concrete Accessories, Inc.

Called Hold-Down anchors, these devices transfer the vertical load to the casting bed. The choice of connecting linkage is largely dependent upon the design of the bed and the amount of clearance available below the form pallet.

One of the basic features of the Hold-Down anchor is the wire helix that permits the use of a special contour-threaded high-strength coil bolt for attachment and release of the anchors. This type of bolt is self-cleaning and not easily damaged, according to the manufacturer.

The new anchors are available in four types.

For further information write to Superior Concrete Accessories, Inc., Dept. C&E, 9301 King St., Franklin Park, Ill., or use the Request Card at page 18. Circle No. 113.

Universal hoist features anti-fouling device

A new universal hoist that features a positive anti-fouling mechanism is announced by The Garrett Corp.'s AiResearch Mfg. Division of Los Angeles.

Weighing only 47 pounds, the universal hoist is operated electrically or manually and has a lifting capacity of more than 6,000 pounds. The hoist is powered by a 3-phase 400-cycle reversible ac motor. A modified version is available with a 24-volt dc or 60-cycle ac motor, if desired.



Design compactness is achieved by enclosing the motor inside the cable drum and through the use of compound differential planetary gearing, which meets the requirements of a high gear ratio. The planetary gearing is irreversible, eliminating the danger of the load being involuntarily released when operated by hand.

For further information write to The Garrett Corp.'s AiResearch Mfg. Division of Los Angeles, Dept. C&E, 9851 Sepulveda Blvd., Los Angeles, Calif., or use the Request Card that is bound in at page 18 of this issue. Circle No. 35.

For more facts, circle No. 366+

Level-transit and tripod are offered as package

A new level-transit featuring aluminum-alloy standard and base construction is offered by the David White Instrument Co. A European-type wide-frame tripod and a shock-resistant Fiberglas carrying case complete the package, designated Model 8010.

Among the instrument's features are an enclosed base for protection from bumps, dirt, and moisture, and a stamped horizontal circle to permit

easier reading by the user.

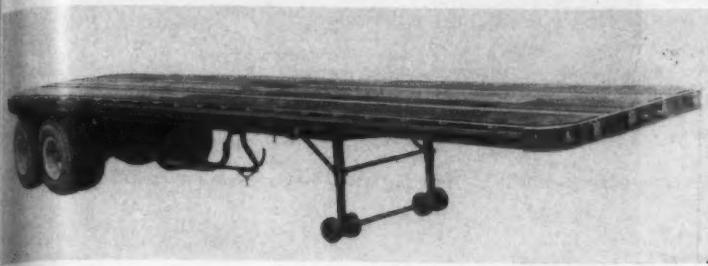
Rack-and-pinion internal either-hand focusing, a built-in sunshade, and the firm's 12-power optical system are features that have been retained on the new unit.

For further information write to the David White Instrument Co., Dept. C&E, 2051 N. 19th St., Milwaukee 5, Wis., or use the Request Card that is bound in at page 18 of this issue. Circle No. 34.



YOU ARE INVITED TO
TD-25 OPEN
NOVEMBER 30-DECEMBER





This new lightweight flat-bed trailer, the Talbert Model TF25-35, features wide-flange construction on main frame members for added payload capacity. Offered at an empty weight of 10,500 pounds, this 35-foot tandem-axle unit has a rated payload capacity of 50,000 pounds. For further information write to Talbert Trailers, Inc., Dept. C&E, 7955 W. 47th St., Lyons, Ill., or use the Request Card at page 18. Circle No. 98.

OPEN HOUSE, U.S.A.

INTERNATIONAL HARVESTER COMPANY
180 NORTH MICHIGAN AVENUE - CHICAGO 1, ILLINOIS

An open invitation to profit-conscious contractors

At Open House, U.S.A., you won't be viewing "just another big tractor." Not on your life! This is the big, new International TD-25's "coming out party." And the "25" is coming out "loaded for bear!" At Open House, U.S.A., you'll preview a king-sized crawler that has more proven, high-output exclusive features than anything else on tracks...The new TD-25 is:

- the only king-sized crawler powered by the new 230-hp, 6-cylinder, direct-start DT-817 diesel—loaded with capacity-adding, life-prolonging features no other engine has!
- the only king-sized crawler with world-proven Planet Power steering, that gives you fingertip power-steering and Hi-Lo, on-the-go power-shifting. Full-time "live" power on both tracks adds payload capacity as no other crawler can!
- the only king-sized crawler with International-developed double-box-beam track frames, the industry's strongest; the only one carried on Dura Rollers—the rollers you can power-lubricate without affecting seal life or efficiency
- the ones that make 1,000-hr lube checks practical!
- the only king-sized crawler with so many far-ahead features it can outearn competitive rigs up to 50% on an amazing variety of tough jobs!

Watch for the word on when and where your Distributor will hold TD-25 Open House, U.S.A. And be there, for sure. Be one of the first to size up the profit-making advantages of the big, new International TD-25.

More productive power to you!
International Harvester Company



International[®]
Construction
Equipment

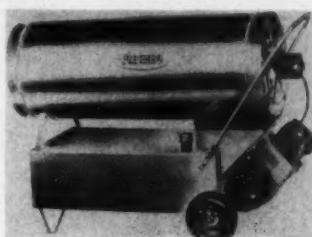
International Harvester Co., 180 North Michigan Ave., Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers and Bottom Dump Wagons . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

Portable utility heaters are fully automatic

A new line of portable, all-purpose, fully automatic utility heaters is announced by the Siebring Mfg. Co.

Called Weather Master, the unit has an 18-hour-capacity fuel tank and is compactly designed and mounted on semipneumatic wheels and casters.



Easy to operate, the heater can be plugged into a regular 115-volt ac outlet.

The combination electric and oil-burning heaters are available in sizes of 200,000 and 300,000 Btu, with weights of 156 and 175 pounds, respectively. They can be operated on kerosene or on No. 1 or No. 2 fuel oil.

For further information write to the Siebring Mfg. Co., Dept. C&E, 701 Main St., George, Iowa, or use the Request Card at page 18. Circle No. 89.

DRILL CONCRETE IN SECONDS

Instead of
Hours with PENNDRILL



Holes can be drilled thru any type masonry material—concrete, marble, brick and tile; including reinforcing bars or other steel encountered.

Using diamond bits as the cutting agent, holes are drilled faster and at a lower cost than by any other method.

PennDrill equipment is designed for drilling holes vertically, horizontally or at any angle. Fast cutting, long life diamond bits in stock from 3/16" to 14" in diameter.

Millions of holes have been drilled with PennDrill bits, cutting job costs up to 60%.

Write for
illustrated literature

PENNSYLVANIA DRILLING CO.
MASONRY DRILL DIVISION
1201 Banksville Road, Pittsburgh 16, Pa.

For more facts, circle No. 367

Product Parade

This blacktop spreader can be adjusted for any width up to 8 feet.

WINSLOW—PORTABLE TRUCK SCALE

THE CONTRACTORS' SPECIAL SCALE



For use at temporary and permanent locations—at stock piles and by bituminous material contractors at the job site. Capacity: 15-18-20-30, 40 and 50 tons.

Write us for name of your nearest distributor.

WINSLOW SCALE COMPANY

P.O. Box 1198
Terre Haute, Indiana

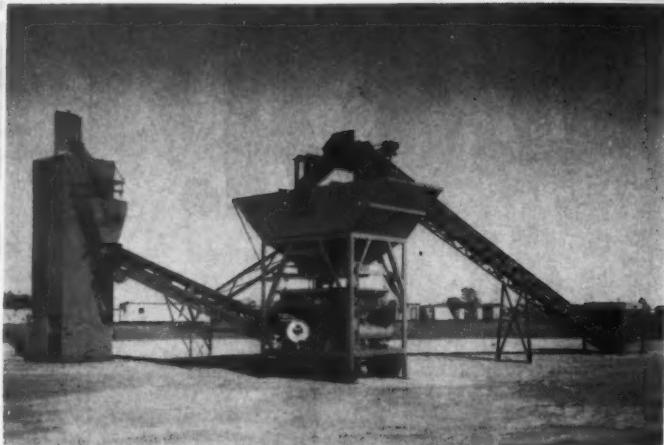
For more facts, use Request Card at page 18 and circle No. 368



HIGH PRODUCTION...PORTABILITY...

**PORTABILITY
IS NO
SIDE-LINE
WITH US!**

CONTACT US FOR THE
NAME OF THE DEALER
NEAREST YOU



For extremely high production, the Ross Model 30-3 Batching Plant, 220 bbls. cement silo and 65'24" belt conveyor, and 3-yd. Feeder Hopper setup is the answer. The results of Ross Engineering, this versatile setup has a 300 to 600-yd.-per-day capacity with the proper allied equipment.

ROSS PORTA-PLANT

BOX 446

PHONE MI 5-2697

BROWNWOOD, TEXAS

**HIGH PRODUCTION...
LOW COST...
VERSATILITY**

For more facts, use Request Card at page 18 and circle No. 369

Power-Packs are Cutting Costs . . .



on Ohio's North-South Thruway, too!

On more and more highway construction projects you'll find trench filling operations being handled quickly and efficiently by Power-Pack Hopper Conveyors. Along the North-South Thruway in Ohio, 15 of these low cost machines are speeding up the job and saving money for their owners. On many sections of this new interstate highway a Power-Pack and one operator handle all of the fill hauled by big tandem

axle trucks. Each truck is unloaded in five minutes or less, with the material being transferred directly into the trench without spillage and to the depth required. Production of 800 feet per hour is easily maintained. If your job requires trench filling, road widening or shoulder work get the facts on the Power-Pack model that fits your requirements. See your dealer today or write direct for information and specifications.



POWER-PACK CONVEYOR CO.

836 EAST 140th STREET

GLenville 1-7670

CLEVELAND 10, OHIO

For more facts, use Request Card at page 18 and circle No. 370

New spreader attachment for tractor shovel

A blacktop spreader attachment for the Work Bull 1001 tractor shovel is announced by the Massey-Ferguson Industrial Division.

Easily installed or removed, the spreader can use asphalt or oil mix, hot or cold, with crushed rock or aggregate of any size up to $\frac{3}{4}$ inch.

Operating off the Work Bull 1001 hydraulic system through its own hydraulic motor, the Ram blacktop spreader features independent hydraulic controls for each phase of operation. It rides on its own pneumatic tires with hydraulic height adjustment and is especially advantageous in congested areas.

The spreader can be adjusted to any width up to 8 feet and any thickness from zero to 6 inches. The hopper has a capacity of 2 cubic yards.

Reversible twin augers are used to clean the hopper and assure an even spread. Standard equipment includes a screed ironing pad. A butane heater is available as optional equipment.

For further information write to the Massey-Ferguson Industrial Division, Dept. C&E, 1009 S. West St., Wichita 13, Kans., or use the Request Card at page 18, Circle No. 100.

New hardware reduces form erection time

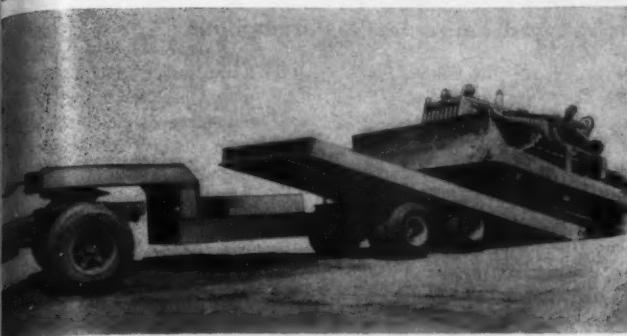
A new piece of hardware for concrete wall-panel assembly is announced by the Rocform Corp.

Called Adapt-A-Clamp, this unit can cut form erection time by approximately 25 per cent, according to the company.

Rigid panels are maintained by permanently attached metal reinforcing channels. Panels are connected by wedge-shaped clamps that engage complementary wedge-shaped ears protruding from exterior upright panel members. The clamps are fastened with a single hammer blow thus locking the adjoining panels and aligning them at the same time.

A complete absence of either wood or metal wales is a feature.

For further information write to the Rocform Corp., Dept. C&E, 151 W. Eight Mile Road, Detroit 14, Mich., or use the Request Card at page 18, Circle No. 82.



The Miller Model OTS handles equipment weighing up to 44,000 pounds gross weight. It has a flat over-the-wheels platform.

New heavy-duty tilt-top announced by Miller

Faster, safer loading of large construction equipment is claimed for a new semitrailor, designated Model OTS by Miller Tilt-Top Trailer, Inc.

Large platform area and 22-ton capacity are the machine's major features.

An extra-low, completely flat, over-the-wheels platform is used instead of the beaver-tail type of platform. The tilting section is available in an 8-foot width and a 16 or 20-foot length. The stationary section adds another 4 feet of length to either side.

Standard equipment includes full-power air or vacuum brakes on all wheels, plus three double-acting hydraulic tilt cylinders to cushion loading action.

For further information write to the Miller Tilt-Top Trailer, Inc., Dept. C&E, 462 S. 92nd St., Milwaukee 14, Wis., or use the Request Card that is bound in at page 18 of this issue. Circle No. 2.

Power-shift transmission for tractor series

Power-shift transmissions, designed to provide instantaneous one-lever control of gear shifting without interruption of power and momentum, are now available on Caterpillar D8 and D9 tractors.

In addition, by a unique utilization of planetary-gear versatility, tractor performance combines the best features of both direct-drive and torque-converter power trains. Heart of the new arrangement is a planetary-gear set, driven integrally by the engine flywheel, which transmits one-third of the engine torque directly to the transmission input shaft and the remaining engine torque through the torque converter.

Shifting ease, the manufacturer points out, insures the matching of tractor speed and power to machine load. The machines can be shifted on the move under full load, then instantly reversed to a high return speed to begin another work cycle.

For further information write to the Caterpillar Tractor Co., Dept. C&E, Peoria, Ill., or use the Request Card at page 18. Circle No. 67.

Cab air washer, cooler, and heater form unit

Crenlo, Inc., announces the Dust-Temp cab air washer for Caterpillar crawler tractors and motor graders.

Designed primarily to provide the operator with a completely dust-free atmosphere, the Dust-Temp unit is also an effective evaporative air cooler, maintaining comfortable temperatures within the cab even in summer heat. With the optional heater attachment, it functions as a cab heater providing dust-free warm air for low-temperature operations. Com-

plete defrosting of all glass surfaces is maintained even at sub-zero conditions, according to the manufacturer.

The unit works without special attachments on tractors without an electrical system. The water-circulating pump and pressure fan are direct-engine-driven.

For further information write to Crenlo, Inc., Dept. C&E, 1690 Fourth Ave. N. W., Rochester, Minn., or use the Request Card at page 18. Circle No. 10.



Loads 800 tons of cinders a day. Moto-Loader arm design permits loading higher trucks, provides excellent side visibility when fully raised, and eliminates scissor action for safe operation.

"BEST FRONT END LOADER BUILT"** —FIELD REPORTS SHOW MOTO-LOADERS DELIVER MORE

*D. W. Oplinger Construction Company of Nanticoke, Pa., describes its Lorain ML-157 Moto-Loader as "The best front end loader built. We have two others (a different make) and they are not as good as this Moto-Loader."

Progressive contractors report that Lorain's balanced design makes the big difference, especially when the going's tough.

Power balance provides the right degree of power needed for tractive effort when crowding into a pile, moving to trucks or bins. No wheel spinning, no wasted horsepower.

Weight balance. Lorain puts the center of

gravity down where it belongs. Moto-Loader's weight distribution eliminates bounce and teeter even when carrying the heaviest loads.

Control balance lets the operator combine operations for faster, smoother loading cycles. Precision timing of each operation—digging, lifting, traveling, dumping—results in more output, bigger profits.

Besides the ML-157 with its 7,000-pound carrying capacity, there's the ML-153 with 6,000-pound carrying capacity. See for yourself, contact your Lorain distributor for a demonstration.



One foot travel control lets operator control forward and reverse travel, plus acceleration. Hands are free for steering and bucket control. Results: bigger payloads.

THE THEW SHOVEL COMPANY, LORAIN, OHIO

LORAIN® ON THE MOVE

PLANTS in Lorain, Elyria and Bucyrus, Ohio.

PRODUCTS—Power shovels, cranes, draglines, clamshells, and hoes on crawler mountings from $\frac{1}{2}$ - to $2\frac{1}{2}$ -yard capacity • Cranes from 7 to 80 tons . . . on crawlers, and as rubber-tire Moto-Cranes, and Self-Propelled Cranes • Rubber tire front-end Moto-Loaders in $1\frac{1}{4}$ - and 2-yard models.

OUTLETS—Lorain products sold and serviced by 240 distributor outlets throughout the world.



The 410's boom—in addition to telescoping in and out at a touch of the operator's hand—tilts hydraulically to an angle of 60 degrees from the horizontal and rotates through continuous circles in either direction.

Fully hydraulic crane has 10-ton capacity

Austin-Western announces the Model 410 self-propelled hydraulic crane.

A fully hydraulic, self-propelled crane with a 10-ton capacity, the machine features a telescoping, rotating boom that has a basic 15-foot horizontal reach and 10 feet of hydraulically powered extension. Optional manual extensions give the crane a maximum horizontal reach of 47 feet.

Four-wheel power steering, 2-wheel drive, and torque converter are standard equipment. The crane is equipped with a gasoline or diesel engine, has 14.00×24 pneumatic tires, and offers normal road speed up to 23 miles per hour.

Available accessories include a heavy-duty double-acting clamshell bucket, a 24-inch-diameter, hydraulically operated auger for post holes, and a remote-control maintenance platform.

For further information write to Austin-Western Works, division of Baldwin-Lima-Hamilton Corp., Dept. C&E, 601 N. Farnsworth Ave., Aurora, Ill., or use the Request Card at page 18. Circle No. 11.

Waterstops made of polyvinyl chloride

A new line of polyvinyl chloride waterstops, designed to provide watertight concrete joints for a wide range of construction projects, is announced by Lexsuc Inc.

The waterstops are available in two functional types—corrugated lock-rib and dumbbell—and in a complete range of sizes. They are manufactured by extrusion process from a special elastomeric plastic compound, the basic resin of which is polyvinyl chloride.

For further information write to Lexsuc Inc., Dept. C&E, P. O. Box 326, Solon, Ohio, or use the Request Card at page 18. Circle No. 40.

To obtain further information on any of the products described in this section, circle the number given at the end of the item on the handy Request Card that is bound in at page 18 of this issue.

Portable space heater is LPG-burning unit

The Stow Mfg. Co. announces a portable LPG space heater called the Model LPG200. Multipurpose, radiant, and recirculating, it is designed for quiet, sootless production of high-volume heat—200,000 Btu.

A $\frac{1}{4}$ -hp motor drives a fan that circulates the warm air at a rate of 2,000 cfm. The standard model, which weighs 45 pounds, includes a burner control that quickly turns off the

fuel if the power should fail or the flow of gas be interrupted.

The LPG200 can be quickly connected up to a gas bottle and a 110-volt ac outlet. Optional thermostats can be added.

For further information write to the Stow Mfg. Co., Dept. C&E, 40 Shear St., Binghamton, N. Y., or use the Request Card at page 18. Circle No. 56.



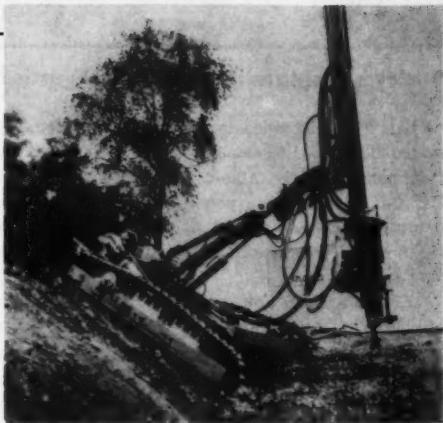
HERB TURNER TELLING CAT EXCAVATION

1936—The performance of H. Turner & Son's first Cat Excavator Engine helped establish their company as one of the leading contracting firms in southwestern Wisconsin.



1959—More than twenty years later, this firm operates in several states with 81 Cat Engines in its spread.





Gardner-Denver's new blast-hole drilling rig combines the flexibility of a swing boom with the features of an Air Trac.

Blast-hole drilling rig suited to rough terrain

A new swing-boom Air Trac, an all-purpose blast-hole drilling rig especially suited to rough terrain, has been introduced by the Gardner-Denver Co. The unit is designated Model ATD-3000.

Because of the rig's symmetrical design, drilling can be done over the side of either track in an 11-foot-10-inch swing arc. The swing boom, which mounts either a 4 or 4½-inch

drill, is readily adaptable for low horizontal drilling, angle drilling in any position, and breast-hole drilling up to 9 feet 6 inches from ground level.

The boom arrangement makes faster hole collaring easy in roughest terrain, according to the manufacturer. Both bracket and boom are controllable by a single operator.

The machine's low center of gravity permits downhill drilling and makes it maneuverable on any site while towing its own air supply. The operator has access to controls from both front and rear of the rig.

For further information write to the Gardner-Denver Co., Dept. C&E, S. Front St., Quincy, Ill., or use the card at page 18. Circle No. 71.



Offer new material for pretensioning

A new material and technique, said to preclude the necessity of wrapping or encasing prestressed wires, cables, or bars in either pretensioned or post-tensioned structural members, and grouting them later, is announced by the Sika Chemical Corp.

Called Lubabon, the material is a coating for prestress tendons that retards the set of the adjacent concrete until the concrete in the member develops sufficient strength for tensioning.

Stressing wires are first coated with Lubabon and then positioned within the member. Once the concrete has developed tensioning strength, the stressing wires or elements are tensioned and anchored. The set of the concrete around the wires is sufficiently retarded so that it is still unset although the surrounding concrete has developed tensioning strength. However, since the set of the concrete around the tendons has only been retarded, this concrete will ultimately develop considerable strength.

The technique is also valuable in certain pretensioning procedures where bond is not needed or desired at the ends of the structural member.

For further information write to the Sika Chemical Corp., Dept. C&E, 35 Gregory Ave., Passaic, N. J., or use the Request Card at page 18. Circle No. 120.

New tandem steel roller equipped with two seats

A new 1-ton tandem steel roller is offered by The Gledhill Road Machinery Co.

The unit has two seats, one for going forward, one for going backward. Another feature is its ability to roll to within $\frac{1}{2}$ inch of posts, walls, or curbs.

According to the company, the roller is completely portable.

For further information write to The Gledhill Road Machinery Co., Dept. C&E, Box 267, Gallon, Ohio, or use the Request Card that is bound in at page 18. Circle No. 44.

For more facts, circle No. 372

TELL ME HE'S INSISTED ON CAT ENGINES FOR OVER 20 YEARS

Herb Turner, Jr., president of H. Turner & Son, Contractors, has 81 Cat Engines in his spread. Why he does...and why he doesn't buy equipment if the engine brand he wants cannot be specified...makes interesting reading contractors everywhere.

"Buying engine power is just as important today as it was when I bought my first Cat Diesel Engine in 1936.

The performance of that engine could have meant success or failure to my business. While success or failure today doesn't count on a single engine, I can't afford to risk loss with an unreliable engine. So when I specify an engine, dependability is way ahead of everything else. That engine could be the reason for a job going down. For example, suppose I have an excavator loading a crusher on a road-paving job and the engine

fails—crusher stops, haul units stop and perhaps graders and compactors.

"When selecting an engine, I'll specify the kind every time that has given me the best record of dependability. If a dealer resists selling me the engine I want, he may not get the excavator business either.

"Fortunately resistance is the exception rather than the rule. And no matter where I bought a Cat Engine, the Caterpillar Dealer has provided parts and excellent service whenever and whenever I have needed it."

Herb Turner

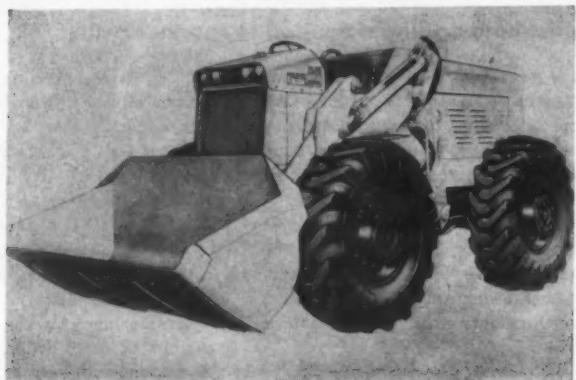
CATERPILLAR

Engine Division, Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

DID YOU KNOW?

"Major excavator companies offer Cat Engines as either standard or optional on all models. In order to be assured of a Cat Engine it is necessary to specify when the excavator order is placed. No matter where you buy excavators with Cat Engines—you get engine service from your Caterpillar Dealer. Genuine Cat parts are available for any Cat Diesel Engine ever built."



Powered by an Allis-Chalmers 130-hp diesel engine, the TractoLoader Model TL-20 has a carry capacity of 9,000 pounds.

CLEAR LAND THE ROME WAY



ROME-K/G CLEARING BLADE cuts construction clearing costs as much as 50%

Clearing land for rights-of-way — reservoirs — lakesites — large construction jobs? Don't waste time and power tearing up the ground and fighting with stubborn, hard-to-dispose-of stumps and roots. The Rome K/G Clearing Blade is the perfect answer for practically any type of land clearing. It shears off a wide swath of small trees and heavy brush at ground level in one pass, leaving topsoil undisturbed. It splits large trees — as big as 81" through the base — into small segments, slices them off and quickly builds compact, fast burning windrows, free from dirt. Stumps can be cut off at ground level, or even below the surface.

Compare this new concept in land clearing with old-fashioned methods — here's positive proof of how the K/G Clearing Blade cuts costs as much as 50% — often more! Sizes available for Cat Diesel Tractors from D4 to D9. See your Rome-Caterpillar Dealer today! Rome Plow Company, Cedartown, Georgia.

ROME®

YOUR ROME DEALER IS
YOUR CATERPILLAR DEALER



For more facts, use Request Card at page 18 and circle No. 373

Loader has single-lever speed, direction control

A new front-end wheel loader, designated TractoLoader Model TL-20, is announced by the Allis-Chalmers Mfg. Co. This machine permits the operator to choose any of 6 speed and direction combinations by operating one lever.

The 23,150-pound unit has a carry capacity of 9,000 pounds. It is powered by a 130-hp diesel engine.

Six buckets are available for use with the Model TL-20, in sizes ranging from $2\frac{1}{4}$ to 5 cubic yards. Reinforced with wrap-around cutting edges, the buckets tip back 40 degrees at ground level for rapid loading. For stability while traveling, a bucket can be tipped back to an angle of 45 degrees when it is only 14 inches above the ground. Maximum dumping angle at full raise is 47 degrees.

Maximum dumping clearance un-

der the hinge pan is 11 feet 1 inch. Depending upon the bucket chosen, dumping clearance under the bucket cutting edge ranges from 7 feet 11 inches to 9 feet 3 inches. Maximum dumping height ranges from the front of the tires to the cutting edge varies from 2 feet 7 inches to 3 feet 7 inches.

The Model TL-20's top travel speed in either direction is 30 mph. It is equipped with a 3.5 : 1 torque converter, rear-wheel power steering, 4-wheel power brakes that can be operated by either right or left foot, and a separate positive-locking mechanical parking brake.

For further information write to the Allis-Chalmers Mfg. Co., Dept. C&E, P. O. Box 512, Milwaukee 1, Wis., or use the Request Card at page 18, Circle No. 5.

Handy new calculator fits in palm of hand

An automatic calculator that measures only $6\frac{1}{2} \times 2\frac{1}{2}$ inches and weighs 3 ounces is available from the Alexander Drafting Equipment Co.

Called Addfeet, the unit features automatic addition and subtraction of dimensions expressed in feet, inches, and fractions as low as

eighths. It also converts inches into feet and fractions into inches.

For further information write to the Alexander Drafting Equipment Co., Dept. C&E, 640-642 N. Chester Ave., Pasadena, Calif., or use the Request Card at page 18, Circle No. 41.

Built for Brawn . . . Priced to Save GENERAL SUPPLY COMPANY



Operates 45-lb.
Rock Drill . . .
Delivers over
75 cfm at 100 psi

*CHRYSLER
heavy-duty
industrial
engine
*Light, fast,
maneuverable!



*Stainless steel and
heat-treated beryllium copper
compressor valves for
longer life

*All instruments
and controls con-
veniently grouped
. . . all working
parts readily ac-
cessible.

*Smaller compres-
sors also available

SKID MOUNTED MODELS
also available, at substantial savings.
Priced as low as \$1995 f.o.b. Kansas City;
\$2045 f.o.b. Sacramento.

PAY LESS TO BUY, TO OPERATE

Porta-Air develops enough power for almost any compressor needs, yet costs far less than big bulky units that cannot give the same speed or maneuverability. Evenly spaced power impulses give smooth air flow — enough for 10-lb. percing breaker or three tampers, or two clay spades, or 3/16" sand blast nozzle. Takes only $1\frac{1}{2}$ gal. of gas per hour. Optional fenders and tool boxes.

WRITE OR CALL COLLECT for complete information
Industrial Compressor Division

GENERAL SUPPLY COMPANY

1920 McGee Trafficway, Kansas City, Missouri — Phone HArrison 1-5477 — TWX: KC 255
1820 "D" Street, Sacramento, California — Phone GIlbert 3-5928 — TWX: SC 45

We invite inquiries for jobber-distributors

For more facts, use Request Card at page 18 and circle No. 374

CONTRACTORS AND ENGINEERS

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Ph.: Loga

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circle No. 43

Save
NY
SOR



Bethlehem's method of stress relieving is designed to improve the elastic properties of the strand and permit higher working loads.

Strand for prestress is stress-relieved

The Bethlehem Steel Co. offers a stress-relieved strand for prestressed concrete, said to have uniform mechanical characteristics from reel to reel, as well as within the individual length contained on a reel.

The combination of preforming the individual wires as they are stranded and the firm's new induction heating treatment method of stress relieving adds a strand that permits ease of welding and is free from undue stresses.

The primary purpose of stress relieving is to improve the elastic properties of the strand and to permit higher working loads than might otherwise be considered feasible.

Stress-relieved strand produced by the Bethlehem method presents a surface that will readily bond with the concrete, according to the company. The strand is of 7-wire design and is offered in sizes ranging from 1/8 to 1/2 inch in diameter.

For further information write to the Bethlehem Steel Co., Dept. C&E, 111 E Third St., Bethlehem, Pa., or use the Request Card at page 18, circle No. 86.

FOUNDATION CONSTRUCTION

CAISSENS

DRILLED AND UNDERREAMED

PIERS

SPECIAL DRILLING PROBLEMS

Offices in Atlanta, Ga.,
Pittsburgh, Pa.,
Washington, D.C.,
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Wire or phone for a quotation
on your next foundation job —

ANYWHERE IN THE WORLD

McKINNEY
DRILLING COMPANY
NACOGDOCHES, TEXAS
P.O. Box 190

For more facts, circle No. 375

KC 255
45

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ENGINEERING

NOVEMBER, 1959

HEAT for LESS with a Siebring Oil Furnace

Super Heat Master Automatic 250,000 BTU

Fully automatic, 250,000 BTU for all difficult heating situations. Instant clean fresh heat to all parts of building. No installation required. No fire exposure. Write for Information & Low Prices!

Siebring MANUFACTURING CO 109 GRACE, GEORGE, IOWA

For more facts, use Request Card at page 18 and circle No. 376



For more facts, use Request Card at page 18 and circle No. 377

From the wide selection of automatic hardsurfacing materials, the most experienced shops choose Lincoln alloy fluxes and electrodes!

The reason is simple . . .

They work better and cost less!

The alloys are in the flux.

And Lincoln hardsurfacing uses carbon steel electrodes. No need for expensive or hard-to-get alloy wire.

Lincoln alloy fluxes when combined with Lincoln electrodes create hardsurfacing deposits of unsurpassed quality at a cost 25% lower than others.

Call your local Lincoln office for information about Lincoln equipment or materials. Write us for specific information on automatic, submerged arc hardsurfacing.

Ask for Bulletin 3200.1.

LINCOLN
...USA

The world's leading manufacturer of arc welders and electrodes, AC motors and battery chargers.

THE LINCOLN ELECTRIC COMPANY

Dept. 5330 • Cleveland 17, Ohio

Extra-long lift arms that provide greater clearance for dumping into high-sided trucks, railroad cars, and tall hoppers are now available as optional equipment on J. I. Case TerraLoad'r Models W-9 and W-10. The new arms, 2 feet longer than standard, give both unit loaders a clear dump height of 11 feet 6 inches with bucket retracted and 10 feet 2 inches with bucket fully dumped. Forward reach at 7-foot lift height is 89 inches. Standard SAE-rated bucket sizes for the new high-lift models are 1½ cubic yards for the W-9 and 1¾ cubic yards for the W-10, with 1¾ and 2-cubic-yard buckets, respectively, available for handling light materials. Carry capacities at 4 mph are 3,750 pounds for the W-9 and 4,500 pounds for the W-10, compared with 6,000 and 6,500 pounds for standard models. For further information write to the J. I. Case Co., Industrial Division, Dept. C&E, 700 N. State St., Racine, Wis., or use the Request Card at page 18. Circle No. 15.



**TAKE
FULL
ADVANTAGE
OF
POWER
STEERING**

1. Valves for Steering Booster and Moldboard Shift
2. Steering Booster
3. Moldboard Shift Cylinder

-- equip your "Cat" Motor Graders with Rivinius Hydraulic Moldboard Shift

Whether your "Cat" grader has Rivinius or another type of power steering, you can use the same hydraulic system to control the moldboard. The Rivinius Hydraulic Moldboard Shift is low cost—and earns more profit by cutting down job time and operator fatigue. At the same time job quality goes up!

SEE YOUR CATERPILLAR DEALER NOW...OR WRITE:

Rivinius, Inc. EUREKA, ILLINOIS

For more facts, use Request Card at page 18 and circle No. 378

"TIRED" in a wink!

You'll get "tired" in a wink when you use Southern Tire's time-tested 'round-the-clock scheduling for your retreading needs. Fast, efficient pickup and delivery service at your job site . . . after work hours . . . helps you cut costly downtime . . . lick tough schedules. And retreads as much as ¼" deeper than ordinary retreads mean longer service for your tires under rugged conditions! Expert workmanship, ultra-modern equipment plus finest quality rubber manufactured to Southern Tire's own specifications guarantee new tire mileage at approximately half of new tire cost!

**OVER 75,000 TIRES WORTH OF EXPERIENCE!
All sizes from 1100 x 24 to 33.5 x 33.**

Always deal with an independent—developers of every major improvement in the industry.

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TIRE COMPANY**
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SHEFFIELD, ALA.
Phone Collect
EV 3-2312

For more facts, use Request Card at page 18 and circle No. 379

Use the Request Card at page 18 in obtain any of the literature described in this section.

Newly designed diesels use variety of fuels

The Hercules Motors Corp. has introduced a completely new line of diesel engines ranging from 50 to 350 horsepower in 3, 4, 6, and 8-cylinder models.

The line includes what are said to be the first diesel engines designed specifically for light and medium trucks (up to 55,000 pounds gcw).

Several models, known as Polydiesels, utilize a new combustion system that makes possible the use of a wide



variety of fuels, including diesel oil, kerosene, jet fuel, and gasoline. No adjustment is required when fuels are changed.

High-speed operation of these units requires few or no changes other than replacement of the engine itself in conversion from gasoline to diesel power.

The heavy truck models range from 200 to 350 horsepower, with capacities up to 76,800 pounds gross combination weight. Featured among these heavier engines is an all-aluminum 2,600-rpm V-8 engine weighing only 1,450 pounds and having an automotive rating of 225 horsepower when naturally aspirated.

The manufacturer states that, in addition to their automotive applications, the new engines can be used to power a wide variety of construction machinery.

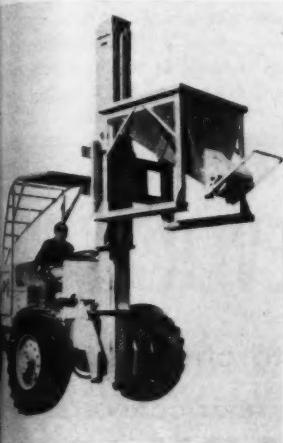
For further information write to the Hercules Motors Corp., Dept. C, Market and E. 11th St., Canton, Ohio, or use the Request Card at page 18. Circle No. 117.

For more data on any item, circle indicated number on card at page 18.

Offer concrete hopper for fork-lift truck

A concrete hopper is now available as an attachment for the Koehring lift fork truck.

Available in $\frac{1}{2}$ and $\frac{3}{4}$ -yard sizes, the attachment is a fork-entry unit that slips on easily over the forks for fast attaching and detaching. The



Kwik-Mix concrete-hopper attachment is a heavy-duty, all-steel welded unit that features fast discharge through a steep, angled body.

It is operated by a lever so that it can be closed for partial discharge.

The $\frac{3}{4}$ -yard hopper is $48 \times 60 \times 56$ inches high. It weighs 580 pounds. A hydraulically controlled discharge valve is available as an optional extra.

For further information write to the Kwik-Mix Co., division of Koehring Co., Dept. C&E, 235 W. Grand Ave., Port Washington, Wis., or use the Request Card at page 18. Circle No. 121.

DUDGEON HYDRAULIC JACKS



DESIGNERS and MANUFACTURERS OF
Hydraulic Units For Special Applications

RICHARD DUDGEON INC.
79 BERGEN STREET BROOKLYN, N. Y.
• ST 9-4840

For more facts, circle No. 380

NOVEMBER, 1959



A lift truck equipped with a specially constructed spanner boom performs an important duty in the manufacture of prestressed-concrete slabs by the Ruby Lumber Co. of Madisonville, Ky. The firm uses a Hyster Challenger 200 lift truck of 20,000-pound capacity to handle the slabs. A cantilever boom of the company's own manufacture, extending on both sides of the lift truck, is mounted on the forks. Cables hook into eyes inserted near each end of the concrete slabs. The boom telescopes to accommodate slabs of different lengths. For further information on lift trucks, write to the Hyster Co., Dept. C&E, P. O. Box 4318, Portland, Ore., or use the Request Card at page 18. Circle No. 121.



This overall view of Schmidt's two crushers show how the five International engines help give high production at low cost.

5 Internationals major power on high output double crusher setup

Schmidt Const. Co., Arvada, Colo., uses International engines for major power in this double crushing plant that provides base rock and aggregate for surfacing 18 miles of U. S. 285 north from Fairplay, Colo.

The semi-electric Cedar Rapids 2x Super Commander crusher producing 3-in. minus base rock is fed by a Kolman conveyor powered by an International

U-281 gasoline engine. An International UDT-1091 turbocharged diesel on a 158 KVA generator supplies electric power for this same crusher.

The second crusher, producing $\frac{3}{4}$ -in. minus material for the asphalt mix, uses three International engines in this manner: U-281 on conveyor feeding UDT-1091 powered scalping unit; and another UDT-1091 turbocharged diesel driving the Symonds short head cone crusher.

For crushers or any of your powered construction equipment, International diesels or carbureted engines give you dependable low cost performance that pays off in most profitable contract completions. Your International Power Unit Distributor or Dealer sells and services 24 models ranging from 16.8 to 385 max. hp. See him for your best deal at repower time or specify International in your new machines.



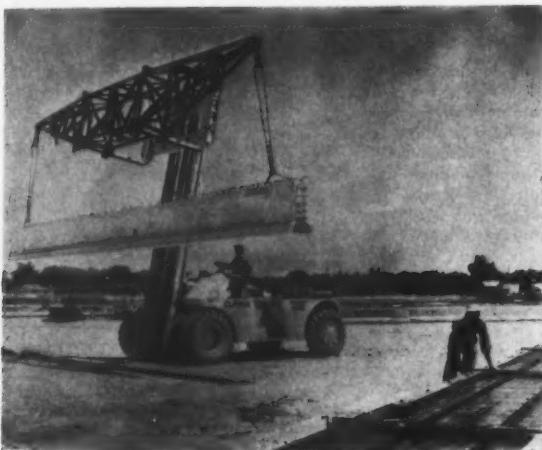
Supt. Frank Gamara, shown above, says, "We have a well balanced plant here that is giving us high production at low cost. The engines are mostly International with three big UDT-1091 turbocharged diesels supplying the bulk of our power needs. We have used them on other plants and have gotten fine results through years of hard work in the dustiest of conditions. An engine needs lots of guts to keep the crusher rolling. The snappy response of the UDT-1091 when the governor opens up really holds up the crusher's rpm's. Internationals are excellent power for fine crushing equipment."

For more facts, use Request Card at page 18 and circle No. 381



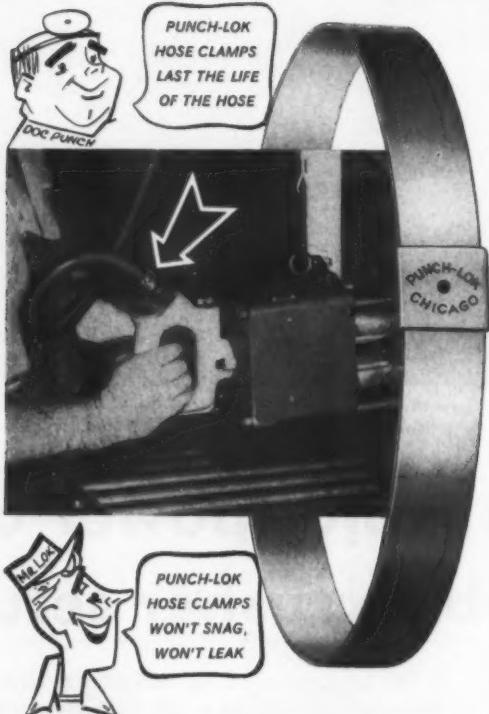
**International®
Construction
Equipment**

International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill.
A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors... Self-Propelled Scrapers and Bottom Dump Wagons... Crawler and Rubber-Tired Loaders... On-Highway Trucks... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.



Damage to prestressed-concrete double-tee and channel slabs caused when the members were stripped from permanent forms has been eliminated by use of a specially equipped rigging fork truck at Dura-Stress, Inc., Leesburg, Fla. Lifts are now made with a Clark fork truck with a boom attachment capable of carrying structural shapes 80 feet long. The boom itself is 36 feet long and is made of tubular steel and angle-iron bracing. Sleeves on the bottom receive the truck's forks. Adjustable slings, hanging from each end of the boom, lift the members through hook-eyes embedded in the concrete. With the attachment, which was fabricated by Dura-Stress, the fork truck, a CY-400 of 40,000-pound capacity, services the company's 11 casting beds, handling beams, columns, girders, piling, double-tee slabs, joists and channels. For further information about fork-lift trucks write to the Clark Equipment Co., Industrial Truck Division, Dept. C&E, P. O. Box 31, Battle Creek, Mich., or use the Request Card at page 18. Circle No. 73.

small components do a BIG JOB!



PUNCH-LOK HOSE CLAMPS

...are very small in comparison to many of the machines on which they're installed, but PUNCH-LOK Hose Clamps do a BIG, BIG job. Their absolute dependability in clamping vital hose connections makes high production schedules possible. They are on the job day after day... never require maintenance or repairs. Easy and quick to apply, once clamped they stay clamped for the life of the hose.

See your nearby Punch-Lok distributor or write for free descriptive catalog.



"The sign of a GOOD Hose Clamp"

PUNCH-LOK
Company

Dept. J, 321 N. Justine Street, Chicago 7, Illinois

For more facts, circle No. 382

Portable space heater eliminates odor, smoke

A new portable space heater is available from the White Mfg. Co.

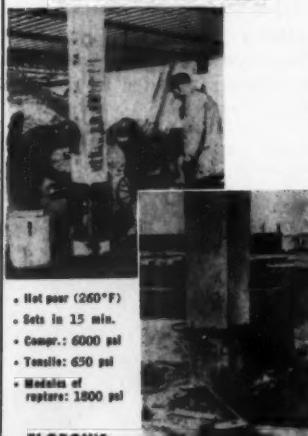
The heater features a stainless-steel combustion chamber said to actually burn out all objectionable odor and smoke, and to permit clean, odorless operation.

Air is supplied by a furnace-type blower instead of a fan for positive air circulation and quiet operation. Fuel pump, blower, and motor are direct-coupled to eliminate V-belts and possible slippage.

The heavily constructed 16-gage fuel tank will operate the heater for 14 hours of continuous burning and longer when the heater is equipped with a thermostat. The 3-way shutoff valve on the fuel line eliminates smoke and odor on shutdown and on intermittent operation when used with a thermostat.

For further information write to the White Mfg. Co., Dept. C&E, 1227 W. Beardsley Ave., Elkhart, Ind., or use the Request Card at page 18. Circle No. 8.

QUICK SPLICE CONCRETE PILING IN MINUTES!



FLOROK'S PLASTICEMENT
A PRODUCT OF THE
CHARGAR
CORPORATION
1011 Dixwell Ave., Hamden, Conn.

For more facts, circle No. 383

45 LEVER TYPE models to choose from!

THE WORLD'S MOST COMPLETE LINE **SIMPLEX LEVER JACKS**



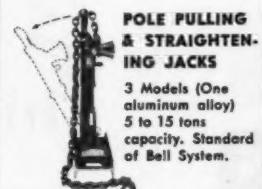
SINGLE ACTING, RATCHET LOWERING

11 Models, 5 to 20 tons capacity. Full capacity on toe or cap.



EMERGENCY & BRIDGE JACKS

2 Models, 15 tons capacity. Pivot on base.



POLE PULLING & STRAIGHTENING JACKS

3 Models (One aluminum alloy) 5 to 15 tons capacity. Standard of Bell System.



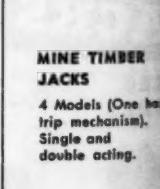
REEL JACKS

3 Models (One aluminum alloy) 5 to 10 tons capacity. "T" Base.



GEARED JACKS

3 Models, 25 to 35 tons capacity. Side toe lift.



MINE TIMBER JACKS

4 Models (One has trip mechanism). Single and double acting.



TRACK (TRIP) JACKS

13 Models (Five aluminum alloy) Single and double acting.



BELT TENSIONING JACK

5 ton capacity.



Also Lever type, Cable & Wire Tensioning, Pipe Pushing & Pulling, Tie Remover, Tie Replacer, and Siding & Flooring Jacks.

TEMPLETON, KENLY &
251 GARDNER ROAD
BROADVIEW, ILLINOIS

For more facts, circle No. 384

For further information on any product described in this section, circle the indicated number on the Request Card at page 18.

New-type screed for concrete beams

The Stow Mfg. Co. has available a new lightweight twin-beam vibrating screed designed especially for striking off prestressed-concrete beams. The 4-foot Model TEA weighs only 140 pounds, making it easy to lift over any depressers, the company points out.

An electric motor or gasoline engine powers a vibrator head that

Designed for mounting on the back of any pickup truck, the Dreamer, a custom-built coach, is available in three basic models. According to the manufacturer, the unit can be installed in about 15 minutes. The coaches are constructed of kiln-dried white pine and covered with aircraft aluminum skin. They are fully insulated for summer or winter living. Birch-finished interiors include a complete galley with self-contained water system and icebox, plus a dining area that converts into a sleeping arrangement for three. For further information write to the Coons Custom Coach Mfg. Co., Dept. C&E, Oswego, Kans., or use the Request Card at page 18. Circle No. 20.



TYPE

from!

ETE LINE

EVER
ACKS

EMERGENCY
& BRIDGE
JACKS

2 Models, 15
tons capacity.
Pivot on base.

REEL
JACKS

3 Models 10ton
Aluminum alloy
5 to 10 ton
capacity.
"T" Base.

NUMBER
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N, KENLY
ER ROAD
ILLINOIS

AND ENGI-



...mits high-speed vibration evenly along the two beams. By using two beams, the screed makes two passes in sequence. The first beam strikes off the concrete, and the second one removes any air bubbles, leaving a completely smooth surface.

A special feature of the unit is a vibrating head on which the amplitude of vibration can be adjusted to suit the particular job.

For further information write to The Stow Mfg. Co., Dept. C&E, 40 Cedar St., Binghamton, N. Y., or use the Request Card at page 18. Circle No. 55.

For more facts, circle No. 386→

DESLAURIERS
Econ-O-clamp
THE COLUMN CLAMP THAT WORKS LIKE A SQUARE

PATENTED

- CUTS COST
- SPEEDS FORMING
- STORES EASILY
- NO LOOSE PARTS
- FOR SALE OR RENT

Form all square and rectangular columns 1" thru 36". Automatically squares columns.

WRITE TODAY for Free Folder on Deslauriers Form Clamps and Forms

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For more facts, circle No. 385



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Permitables
Seismograph Explosives
Blasting Agents
Blasting Caps
Searie Blasting Caps
Blasting Accessories

Quadrature Process Chemicals
Flootation Reagents
Floculating Agents
Film Forming Agents
Surface Active Agents

Blasting Assistance When You Need It...

HOW CYANAMID PRE-BID SERVICE CAN HELP YOU GET THE JOB!

Estimating hard-rock blasting costs can make or break a bid. Figure too high, you lose the job; figure too low, you lose your shirt.

To help you estimate the amount and type of explosives needed for most economical blasting and best fragmentation for easy loadability, Cyanamid explosives engineers offer a unique Job-Tailored Pre-Bid Service.

Here's how it works:

As soon as plans are ready on jobs involving considerable rock work, a Cyanamid explosives engineer studies the job area geology, determines the nature and quantity of rock, recommends the drilling pattern and type and amount of explosives for lowest effective blasting costs.

He checks the area for vibration hazards, access roads, cut-and-fill areas and waste areas and also locates borrow pits, railroad spurs, etc.

He delivers the facts to interested bidders and, on request, "walks the job" to answer specific questions.



This money-saving, time-saving Pre-Bid Service is just one of the many ways Cyanamid's explosives engineer can help you. You benefit from his valuable on-the-job technical assistance as well as Cyanamid's complete line of high quality explosives and accessories.

Next time you bid on a hard-rock job, let an experienced Cyanamid explosives engineer help you!

AMERICAN CYANAMID COMPANY
EXPLOSIVES AND MINING CHEMICALS DEPARTMENT
30 ROCKEFELLER PLAZA, NEW YORK 20, N.Y.

Product Parade

**FOR \$ SAVINGS AND JOBS WELL DONE
use PREHY
GROUTING AND CONCRETE
PLACING EQUIPMENT**



- Soil Stabilization
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- Column construction, fireproofing

In the size to meet your most intricate needs.

Write for descriptive literature or see your local distributor.

PREHY COMPANY

For more facts, use Request Card at page 18 and circle No. 387



The 1960 Ford truck line ranges in gvw from 4,600 to 51,000 pounds with gross combination weights up to 75,000 pounds.

**New design improvement
for Ford's 1960 trucks**

The Ford Motor Co.'s 1960 line of heavy and extra-heavy-duty trucks features greater gvw ratings, extensive model flexibility, and increased engine fuel economy.

The line includes more than 20 conventional, tilt-cab, and tandem models with maximum gvw's ranging from 22,000 to 51,000 pounds. A total of seven improved 1960 engines are offered, including three Super Duty and V-8's.

In the heavy and extra-heavy conventional models, F-700 through F-1100 series, the additional application of three new front axles and rear axles, in either single-speed or 2-speed versions, provides added model flexibility and versatility. Maximum gvw ratings are also increased from 2,000 to 3,000 pounds over comparable 1959 models, on virtually all models.

For further information write to the Ford Division, Ford Motor Co., Dept. C&E, P. O. Box 608, Dearborn, Mich., or use the Request Card at page 18. Circle No. 13.



Naylor Spiralweld pipe was selected for this unusual project where a large volume of water was required for grading gravel.

With good reason, too. Here is pipe that provides light weight without sacrifice of strength, due to its exclusive spiral-lock-seam structure. It's easier to handle and install—particularly when combined with the one-piece NAYLOR Wedgelock cou-

pling which requires only a hammer to assemble or knock down. This combination adds up to faster installation and all-round economical performance.

For water, dredging, air or ventilating service, it will pay you to consider these NAYLOR advantages for your lines.

Write for Bulletin No. 59.

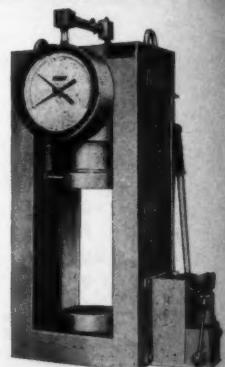


**NAYLOR
PIPE Company**

1270 East 92nd Street, Chicago 19, Illinois

Eastern U. S. and Foreign Sales Office: 60 East 42nd Street, New York 17, N.Y.
For more facts, use Request Card at page 18 and circle No. 388

**MODEL FT 20
JOBSITE
CONCRETE TESTER**



**FOR: CYLINDERS, CORES,
BLOCKS, BEAMS, CUBES,
BRICK AND DRAIN TILE**
FORNEY'S INC.
TESTER DIVISION
**BOX 310, NEW CASTLE,
PA., U.S.A.**

For more facts, circle No. 389
CONTRACTORS AND ENGINEERS

Product Parade



New heavy-duty mower designed for highways

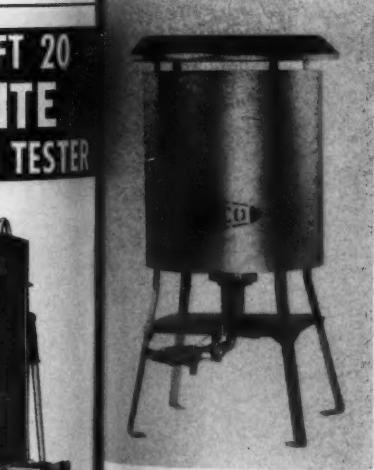
51,000 pounds
provements
trucks
o's 1960 line
avy-duty truck
constructions of 5/16-inch heavy-
ratings, ena-
and increase
more than 20
o, and tandem
n gvw's range
ounds. A tota
960 engines are
ree Super Duty
No. 22.

extra-heavy en-
700 through P
ditional applica-
ent axles and m
single-speed o
provides ad-
versatility. Ma
e also increas
ounds over con-
on virtually all
nformation write
Ford Motor Co
ck 608, Dearbor
quest Card at

for further information on any
product described in this section,
circle the indicated number on the
Request Card at page 18.

New LP-gas salamander furnace-type burner

Nenco Products announces the
Model 200 LP-gas salamander.
The unit features a furnace-type
burner with double primary air in-



resulting in greater heat output
and fuel economy. A new automatic
safety shutoff has also been
incorporating a pilot burner
for greater safety and a throttling
valve for adjustable heat control.
For further information write to
Nenco Products, Dept. C&E, 733 E.
Lapeer Road, Hazel Park, Mich.,
circle No. 49.

For more facts, circle No. 391→

A safety-chain arrangement (as illustrated) provides maximum safety for mowing along highways or in congested areas.

Product Parade

YES! YOU CAN BUY DIRECT SEND US YOUR ORDERS FOR NEW ROTARY SWEEPER BROOM CORES

WE MANUFACTURE ALL SIZES

SUGGESTION—To faraway users. Order cores only without fibres but ready to fit.



- Detroit \$69.50 UP
- Harvester • Little Giant
- Fordson • Mehl-Blum-berg (M-B)
- Grace (3 types) • Rose
- Hough • Spearwell
- Lull • Tampa
- And many others

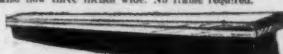
Also Cores Made to Your Specifications

KENNEDY'S
VAN BRUSH MFG. CO. INC.
SINCE 1928
2748 MICH. TOWNE KELLOGG, MI.

Road Builders — it's sensational!

BIG PECKERWOOD BIG

C-O-N-T-I-N-U-O-U-S
Drag Broom Levelers with Spring Steel Wires or Brass Fibers six inches wide and lengths to 12 feet and also now three inches wide. No frame required.

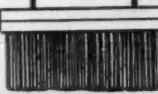


Also furnished Baled with Palmyra-Hickory or Brass Fibers or even Spring Steel Wires.

WE SHIP WORLDWIDE—IMMEDIATELY

In stock — ONLY \$3.50 FOOT

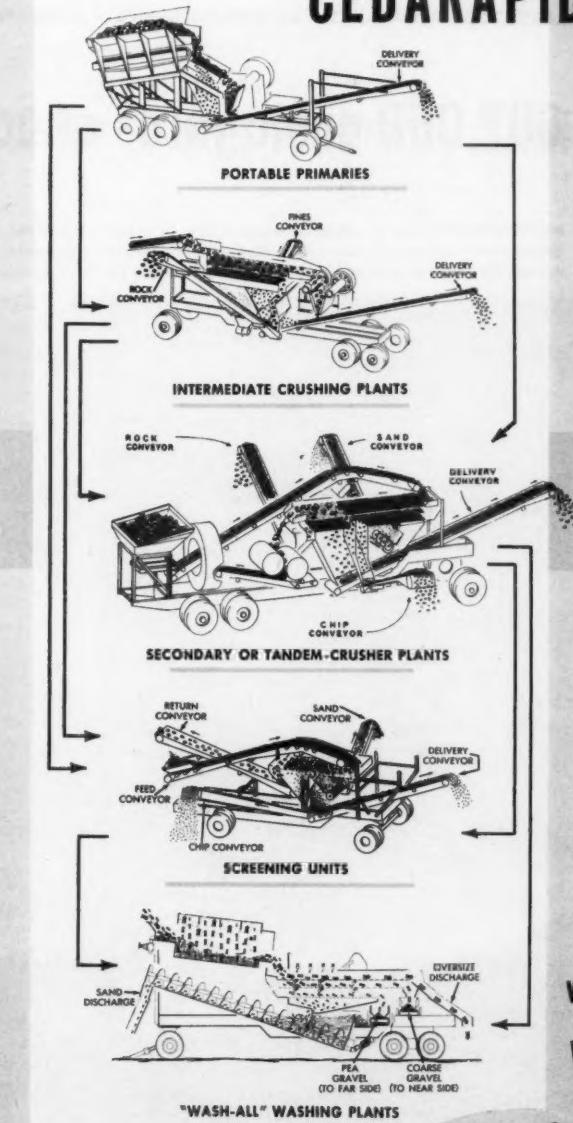
Length 4', 6', 8', or 12'. Wt. approx. 5½ lb. (foot)



3" wide, 15" long,
with two bolts, fits
your present frame.
ONLY \$1.50 EACH

For more facts, use Request Card at page 18 and circle No. 390

CEDARAPIDS UNITIZED PLANTS are engineered for your job!



HERE ARE A FEW OF THE WAYS
YOU CAN COMBINE CEDARAPIDS UNITS
TO MEET YOUR SPECIFICATION
AND TONNAGE REQUIREMENTS

The drawings at the left indicate the basic units that make up a Cedarapids Unitized Plant, with the arrows showing how they may be combined in various arrangements to meet your need. There are 12 models of Cedarapids Portable Primaries, 3 models of Intermediate Crushing Units, any type of Secondary or Tandem-Crusher Plant you want, 4 sizes of Portable Screening Plants, 2 sizes of Portable Washing Plants, plus accessory components such as Vibrating Grizzlies, Pre-screening Attachments, Portable Bins and Conveyors. You can select the units you need to handle any kind of rock at lowest cost per ton.

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U.S.A.

Want lowest cost per ton?
buy **Cedarapids**

Built by IOWA



Send for these Bulletins

These four Bulletins will give you complete details and specifications of the units you can select to make up a balanced, already-engineered Cedarapids Unitized Plant for your specific job. Write to Iowa for Bulletins PP-1 (Portable Primaries); UNIT-4 (Intermediate Units); UNIT-5 (Secondary Plants); and UNIT-6 (Unitized Plants). Your Cedarapids Dealer also will give you full information.





V-type, one-way, and reversible-trip snowplows now available on all models of the Trojan line make it possible to apply to snow-removal operations the over-the-road mobility and maneuverability of rubber-tire tractor shovels. The Wisconsin Special line offers snowplows with cutting edges of 8 feet, 8 feet 8 inches, and 10 feet. Current models of the tractor-shovel line are the 134, 164, 204, 304, and 404. For further information write to the Yale & Towne Mfg. Co., Trojan Division, Dept. C&E, Clinton St., Batavia, N. Y., or use the Request Card at page 18. Circle No. 95.

For further information on any product described in this section circle the indicated number on the Request Card at page 18.

Diamond core drill is vacuum-anchored

A new diamond core drilling machine with an air-vacuum mounting base is announced by the Diamond Core and Saw Division of Portomag, Inc.

Designated Model 120-VE, the machine features a quiet, reversible vacuum unit that develops 2,000 pounds holding power in three vacuum pads at the base of the center column.

A flick of the switch positively anchors the machine on smooth surfaces, as well as porous and irregular surfaces, for both vertical and horizontal drilling operations. Braces, sandbags, and pilot-hole bolts are eliminated.

The Model 120-VE weighs 150 pounds and is designed to operate on 110-volt ac-dc current. Thin-wall diamond bits are available for $\frac{1}{4}$ to 14-inch-diameter cores. Vacuum-mount attachments are also available for converting all makes of diamond core drilling machines.

For further information write to the Diamond Core and Saw Division, Portomag, Inc., Dept. C&E, 1521 E. Nine Mile Road, Ferndale 20, Mich., or use the Request Card at page 18. Circle No. 88.

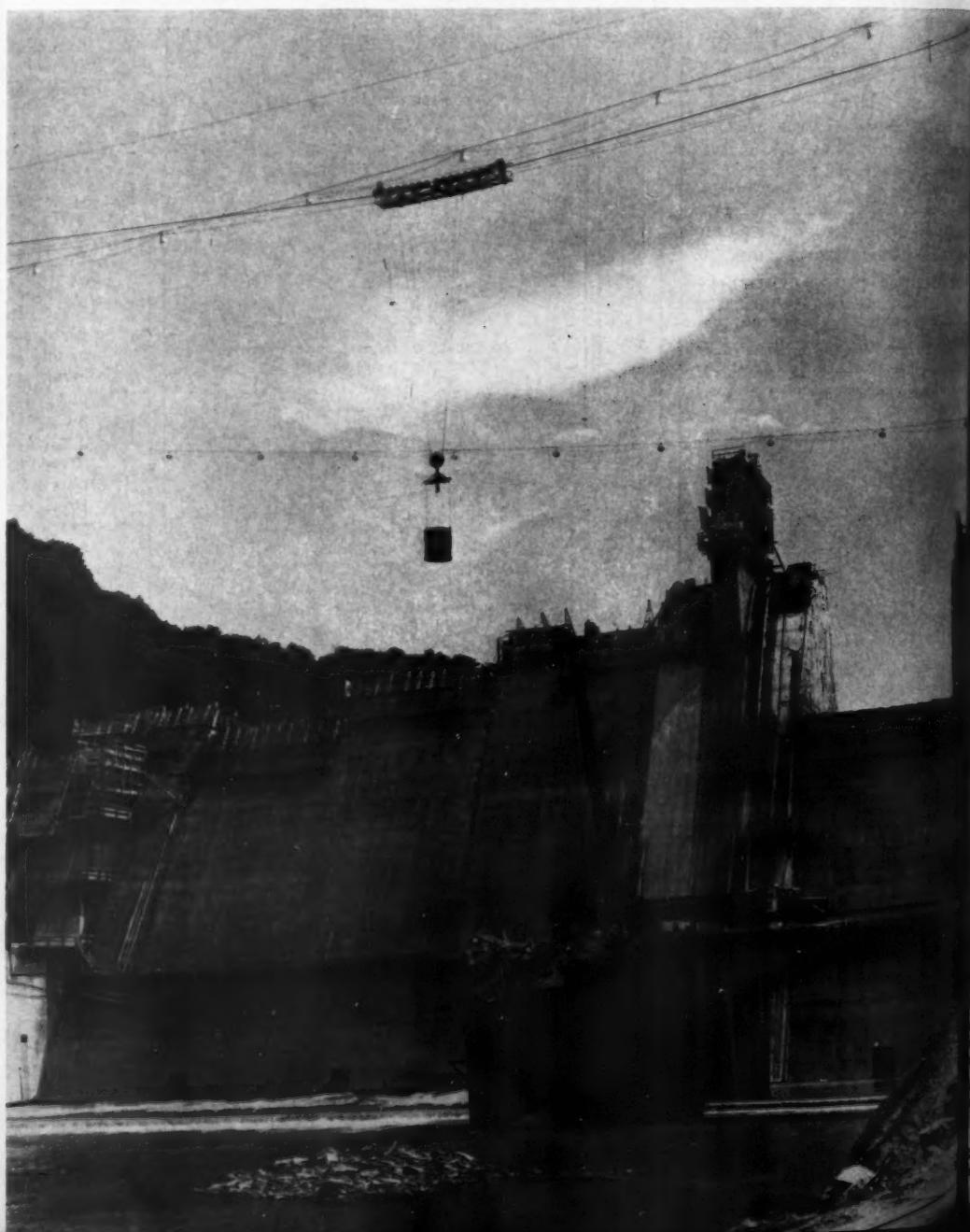


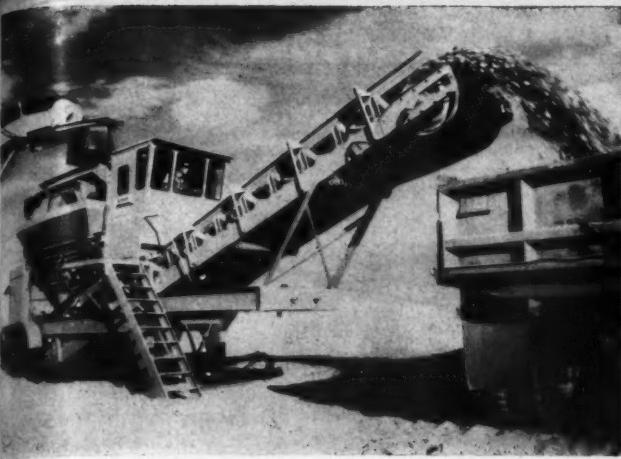
With the Model 120-VE, safe, positive mounting is assured on concrete floors, highways, and walls of either new or old construction.

USS TIGER BRAND — AMERICA'S NO. 1 WIRE ROPE

607,000 cubic yards of concrete delivered

SUTTON DAM—One of the largest flood control dams in eastern United States, located on the Elk River about 80 miles from Charleston, Virginia. Designed and built under the direction of U.S. Army Corps of Engineers, Huntington, West Virginia. Contractors: Joint venture between Arundel, Dixon-Hunkin. General Superintendent for contractors, Jay Hay; Project Engineer, Ed. Hahn.





This new Wescon electronic bulk-material weigher can weigh and load a 6-ton load from hopper to hauling unit in 30 seconds.

Bulk-material weigher is highly mobile unit

A new, highly mobile bulk-material weigher capable of spewing 6 tons of gravel from hopper to truck in 30 seconds is available from the Western Conveyor Co.

Called the Schrock Speed-Weigh, the machine weighs 30,000 pounds. It can be transported directly to the job site by standard hauling equipment, and setup time is approximately

one hour for a 3-man crew.

The unit employs an electronic load-cell device that weighs only the material itself. Guaranteed accuracy is one-half of one per cent.

The Speed-Weigh can be operated from a remote location as long as batch weight remains the same. When loads of various weights are desired, an operator controls batch weight from a control console in the cab.

Electronic weighing components transcribe a printed record in duplicate, of each batch weight, truck number, and total batches.

For further information write to the Western Conveyor Co., Dept. C&E, 2801 Warm Springs Ave., Boise, Idaho, or use the Request Card at page 18. Circle No. 48.

New LP-gas burners available in two models

A new LP-gas burner has been announced by the Dual Fuel Heating Equipment Co. Two models are available: the B-2 Blue Flame jet burner with 600,000-Btu capacity, and the B-3 with 1,000,000-Btu capacity.

Both models are said to produce 2,300 degrees of clean, nonpulsating heat instantly, without pumping or preheating.

For further information write to the Dual Fuel Heating Equipment Co., Dept. C&E, 3803 Broadway, Kansas City, Mo., or use the Request Card at page 18. Circle No. 19.

Offer flat-free tire for tractors, cranes

A new nylon tire is announced by the Notat Tire Co.

Notat tires are designed for use on front-end loaders, tractors, cranes, and other construction machinery.

The tires are made from precision parts composed of fabric and banded together with rubber and an internal steel band. According to the company, this method insures a tire life usually greater than the machine itself.

For further information write to the Notat Tire Co., Dept. C&E, 1504 E. 34th St., Chattanooga, Tenn., or use the Request Card at page 18. Circle No. 97.



Main Gut—USS Tiger Brand 3-inch Locked Coil Cable with smooth surface for efficient operation. Interlocked construction holds each wire in its proper position.



Lamar Pearce, Cableway Superintendent, who knows from experience that Tiger Brand Wire Rope is safe and dependable.



**American Steel & Wire
Division of
United States Steel**

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, Distributors Abroad

After "express" on **USS** Tiger Brand Tramway Cable

After 3½ minutes this cableway bucket pours another load of "mud" into the mammoth Sisson Dam near Charleston, West Virginia. They're pouring at the rate of 9,000 cubic yards a week—fast time for one 8-yard bucket. When finished, the dam will contain about 70,000 cubic yards of concrete.

The main "gut" is a Tiger Brand 3-inch Locked Coil Tramway Cable 1,700 feet long. It stretches between one fixed tower and one moveable tower so that the bucket can reach any part of the dam. This cable was bought new for the job and from all indications will still be serviceable when the dam is completed. Other Tiger Brand Locked Coil Cables have been used on two or more big dams before replacement was necessary.

All over this project, Tiger Brand Wire Rope is doing a stupendous job. On one of the more critical applications, a 3,920-foot endless rope is used to pull the carriage assembly. Because of the hard wear this particular rope must take, they used a 1½" 6 x 30 flattened strand rope made of tough Monitor Improved Steel.

Tiger Brand Wire Rope was also used for the hoist line, button line and take-up line, simply because of its excellent performance on various dams such as Mt. Morris and Shasta. Mr. Lamar Pearce, Cableway Superintendent, who has had a world of experience on big dams, uses Tiger Brand more than any other cable. For more information on wire rope, write American Steel & Wire, Dept. 9349, 614 Superior Ave., N.W., Cleveland 13, Ohio.

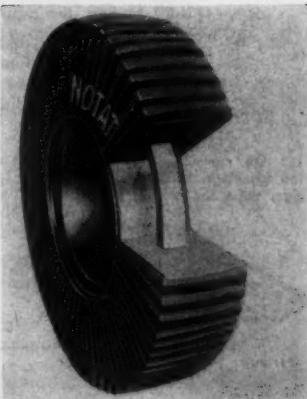
USS and Tiger Brand are registered trademarks

Why Tiger Brand is your best buy

It is made by a company that maintains the most complete research and manufacturing facilities in the steel industry. It is designed by one of the country's most capable staffs of wire rope engineers. It is serviced by thoroughly experienced representatives always ready with their assistance.

Every type of Tiger Brand Wire Rope is designed for specific applications. You get the right rope for the job. It is made by one company, U.S. Steel, and every step of production from ore to finished product is carefully controlled and supervised to guarantee one high standard of quality. Tiger Brand Wire Rope is manufactured by the foremost wire rope producer in the country.

Materials delivered by aerial cableway—the cheapest and easiest way to haul materials needed for the dam.



CONTRACTORS AND ENGINEERS

Campbell Cab for "Caterpillar" Tractor

D7-210 for D7 17A series tractor and
D7-224 for D7 3T series tractor

WINDOWS—safety glass windows throughout. Sliding windshield glass.

CONSTRUCTION—all steel.

COLOR—painted yellow to match color of tractor.

DOORS—two heavy-duty sliding doors provide easy entrance and exit for the operator. Doors can be latched in an open or closed position.

MEASUREMENTS—

D7-210	D7-224
length 56"	length 54"
width 65"	width 65"
height 58"	height 58"

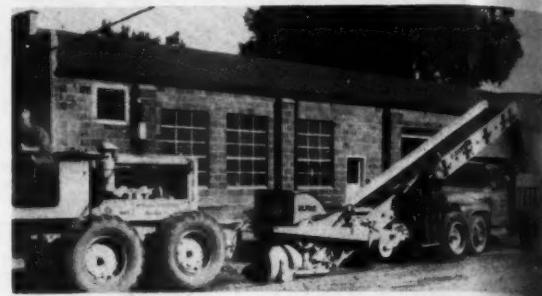
OPTIONAL EQUIPMENT—windshield wiper, sun visor, locking handles, heater-defroster unit.



Campbell Detachable Cab Co. • Wauconda, Illinois

For more facts, use Request Card at page 18 and circle No. 393

Product Parade



On the new Uilmac unit, a full-floating "spade-action" rotary feeder with self-cleaning feeder blades permits loading of loose material or stripping of in-place material.

Multipurpose loader for Cat motor graders

A new high-speed, high-capacity belt loader, the Uilmac Model U-300 is announced by the Uilmac Equipment Co., Inc.

The new U-300 loader is capable of windrow loading of loose material, stripping topsoil in place, trenching out for road widening, and snow removal in street applications. The loader has been designed as an auxiliary attachment for Caterpillar motor graders.

A 36-inch-wide conveyor is driven through a mechanical drive by a Wisconsin 56-hp engine. Discharge height of the conveyor can be varied from 11 feet 9 inches to 14 feet 6 inches. The slope of the conveyor varies from 24 to 30 degrees below the stump rate of most materials.

For further information write to the Uilmac Equipment Co., Inc., Dept. C&E, El Paso, Ill., or use the Request Card at page 18. Circle No. 112.

Support stand for lube hose-reel assemblies

A heavy steel support stand for mounting Lincoln reel and hose assemblies on lubrication trucks is offered by the Lincoln Engineering Co.

The new stand, constructed of heavy-gage sheet steel and channel



"The finest hoist I ever operated"

Ask the operator on any job why he likes his Clyde and he'll tell you feature by feature.

Maybe the internally expanding band friction clutch, its extremely easy and smooth engagement and release and the elimination of shock loads is a feature he appreciates most. Or the fact that he need only 'toe' the extra heavy duty, large diameter brake for safe, sure and accurate load control.

No doubt he will tell you about some of the many other features he likes . . . anti-friction bearings throughout that result in greater line pull with less power . . . low cost maintenance as well as low operating costs . . . correct diameter, semi-steel drums that afford smooth and rapid free spooling.

Clyde operators and owners too, are Clyde's best hoist salesmen . . . the finest compliment that can be paid to the modern engineering and precision manufacture of the Clyde line of finest quality material handling equipment.

For the complete story on the advantages of Clyde's design, write for Bulletin 34A.

This 15-story parking garage in St. Louis is but one of the many jobs on which this Clyde Hoist has helped to maintain or even better construction schedules.

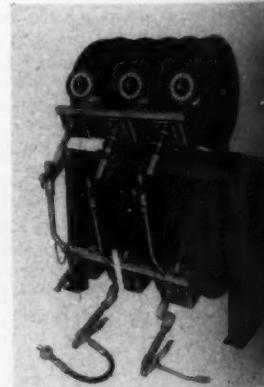
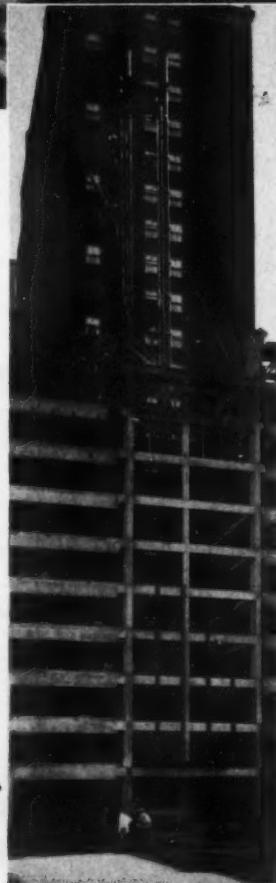


CLYDE IRON WORKS, Inc.

Established 1899
DULUTH 1, MINNESOTA

HOISTS : DERRICKS : WHIRLEYS : UNLOADERS
BUILDERS TOWERS : CAR PULLERS : ROLLERS

For more facts, use Request Card at page 18 and circle No. 394

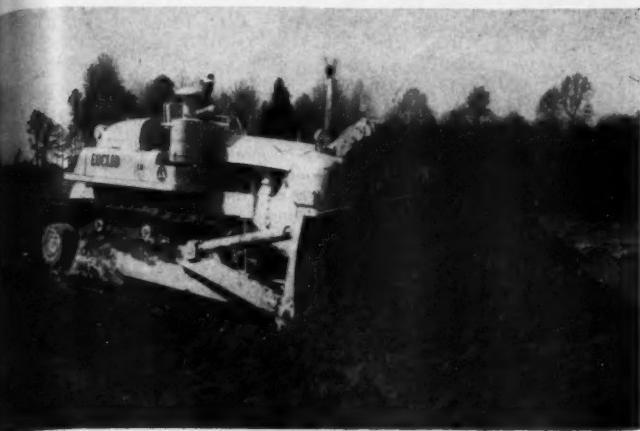


steel cross members, permits installation of six reel assemblies in a compact, space-saving area, three above the cross members, three below. Adjustable guide-arms on the reels allow all control valves within easy reach of the operator.

The stand measures 16½ inches wide, 27 inches high, and 40½ inches long.

For further information write to the Lincoln Engineering Co., Dept. C&E, 4010 Goodfellow Ave., St. Louis 20, Mo., or use the Request Card at page 18. Circle No. 99.

CONTRACTORS AND ENGINEERS



Crawler tractor features top speed of 7.9 mph

The Euclid Division of General Motors announces production of the Model C-6 crawler tractor.

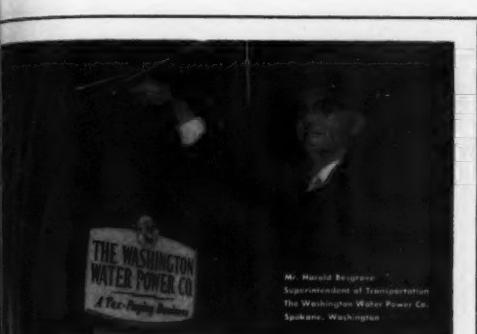
The machine has 211 net horsepower and a Torqmatic drive consisting of torque converter and semi-automatic transmission that eliminates the master clutch. Changes from one of the three forward speed ranges to another, and from forward to reverse and back again, are made under full engine power. Smooth, positive track control is provided by a system of common braking and steering that requires no adjustment of steering clutches or brakes.

A rear-mounted cooling system re-

sults in cleaner operation and permits close mounting of front-end attachments.

Standard track shoes are 22 inches wide, track gage is 78 inches, and total ground-contact area is 5,069 square inches. Over-all dimensions of the C-6 are: 178 inches long, 100 inches wide, and 96½ inches high (exclusive of exhaust). Bare operating weight is 42,000 pounds. Top speed, forward and reverse, is 7.9 mph.

For further information write to the Euclid Division, General Motors Corp., Dept. C&E, 1361 Chardon Road, Cleveland 17, Ohio, or use the card at page 18. Circle No. 110.



"KIM HOTSTARTS keep us ready to roll!"

Like The Washington Water Power Company, KIM HOTSTART engine preheaters will keep your equipment ready to go when the temperature is low. KIM Hotstarts plug into electric circuit when trucks are idle, draw off cold water, heat it, and circulate it back through the engine. High corrosion resistance. Fits gas or diesel engines. See your automotive supplier or write to us....

KIM HOTSTART MFG. COMPANY
West 917 Broadway Avenue
Spokane 1, Washington

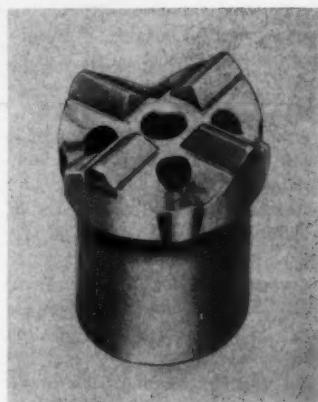
For more facts, circle No. 395



Dust-collecting bit with new carbide insert

The addition of one-use carbide-insert drill bits to its line of CRD dust-collecting bits has been announced by Le Roi.

Available in three sizes—1½, 1¾, and 2-inch—the bits are of the



cross-type, 5-hole design. They can be used interchangeably on the same ½-inch steel with Le Roi's all-steel one-use bits.

The new bits can be utilized with any stoper, air leg, or hand sinker drill that uses the dust-collecting principle.

For further information write to the Le Roi Division, Westinghouse Air Brake Co., Dept. C&E, 1706 S. 68th St., Milwaukee, Wis., or use the card at page 18. Circle No. 70.

Two portable grinders for clearing blades

Two new portable grinders designed especially for sharpening Rome K/G clearing blades are announced by the Rome Plow Co. The grinders are completely self-contained and require no external power source.

One grinder is a lightweight gasoline-engine-powered unit weighing 28 pounds and utilizing a 9-inch-diameter ¼-inch-thick reinforcing carbonized disk with depressed center. The other grinder is a heavier-duty model, driven by a 7-hp engine through a 6-foot flexible shaft.

For further information write to the Rome Plow Co., Dept. C&E, P. O. Box 623, Cedartown, Ga., or use the card at page 18. Circle No. 103.

THE MORSE-STARRETT WIRE ROPE CUTTER



Cutting capacities up to 1 inch, 1-1/16 inch, and 1-1/2 inch.

SEE YOUR DEALER OR WRITE TO
MORSE-STARRETT PRODUCTS COMPANY
1204 - 49th AVENUE OAKLAND 1, CALIFORNIA

For more facts, circle No. 396

FAST

Especially designed cutting blade and dies of the finest steel assure fast cutting action.

EASY

Anyone can operate it. The hammer principle eliminates any special skill requirements.

SAFE

The enclosed cutting blade locked in the body of the cutter assures perfect safety.

PORTABLE

Models for tool kit or stationary operation. Made in three sizes.



Save TIME... and MONEY!!!

MOBILE OFFICE Units are low in cost... Built to your specifications... There's a unit to fill your every need.

Because MOBILE OFFICE Units are easy to move from job to job, they enable you to have office, engineering, paymaster and other facilities at every point of your operation. These units are economical, time saving, rugged and durable. They are self-containing, and are available with air-conditioning, and can be fitted to your specifications.

MOBILE OFFICES are being used by major contractors and other major businesses throughout the United States. In every case they have proven their worth.

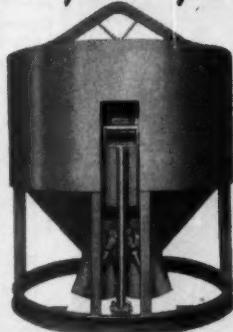
Remember, whatever your needs may be, a MOBILE OFFICE Unit can be built to fill your requirements.

If It's Mobile... We Build It!

MOBILE OFFICE, INC.
Phones: DOrchester 3-1048-9

7314 Stony Island Avenue, Chicago 49, Illinois
For more facts, circle No. 397

NEW! JOHNSON® light-weight CONCRETE BUCKETS



SIZES:

	NET WEIGHT*
½ cu. yd.	355 lbs.
¾ cu. yd.	455 lbs.
1 cu. yd.	700 lbs.
1½ cu. yd.	840 lbs.
2 cu. yd.	1075 lbs.

*approx.

Light in weight, low in cost, this all-new series of concrete buckets from Johnson gives high ratios of capacity-to-weight. Makes each pour more profitable for you! Features: all-welded steel hopper, frame. All working parts above discharge point and well within bucket outline—protected during work, storage, shipment. 50° slope of cone bottom gives complete discharge of medium-slump concrete. Short-stroke, easy leverage handle. Double-clam gates. Stainless steel shafts in nylon bearings. Write today!

— — — Mail to C. S. JOHNSON CO., Champaign, Ill. — — —

Send more information on ____ cu. yd. light-weight concrete bucket

NAME _____

COMPANY _____

STREET _____

CITY, STATE _____



CHAMPAIGN ILLINOIS • STOCKTON CALIF.

For more facts, use coupon or circle No. 398



For quick splicing of precast, prestressed-concrete pile, a new hot-pour, fast-setting compound called Florok's Plasticement is available from The Chargar Corp. The following is the procedure developed to effect the splicing: (1) Base is drilled, or dowel holes are precast to receive reinforcing dowels previously cast into top section; (2) the two units are then lined up properly, and a jig or boot is placed around the joint and securely locked in place; (3) Florok's Plasticement is melted and ladled into spouts of jig or boot, as in photo; (4) it is allowed to set a minimum of 15 minutes; then the jig is removed, work resumed. For further information write to The Chargar Corp., Dept. C&E, 1011-R Dixwell Ave., Hamden, Conn., or use the Request Card at page 18. Circle No. 118.

Don't spoil it. KROIL it!

Loosens Frozen Parts

Don't ruin a valuable piece of equipment merely because some part is rusted tight. Apply KROIL, the amazing new chemical lubricant that creeps into millionth inch spaces (proved by laboratory tests), dissolves rust, supplies necessary lubrication and . . .

18,000 of America's leading plants can't be wrong. They have used KROIL for ten years and depend on it to save expensive labor and valuable parts. They say: "Kroil loosened bushings after a 12-ton press had failed" . . . "on repairing heat treat trolleys formerly destroyed every nut. Now Kroil saves them oil, and time, too."

You too can get these results. Try KROIL on money-back basis. Gallon, \$4.00; with Kroiler squirt gun, \$4.95, f. o. b. factory.

Ask for GENIUS AT WORK—a free publication full of ideas for maintenance men.

KANO LABS.

1057 Thompson Lane
Nashville 11, Tenn.

For more facts, circle No. 399

LOOK FOR FUNK reversomatic DRIVES

on the equipment you buy!

Get smooth, instant power shifting — both forward and reverse, or lift and lower—with JUST ONE LEVER.

Power Shovels
Earth Movers
Road Rollers

Draglines and Cranes
Hoisting Equipment
Industrial Locomotives

FUNK MFG. CO.

P.O. Box 577-B
COFFEYVILLE, KAN.

For more facts, circle No. 400

For more data on any item, circle indicated number on card at page 18.

Rpm recorder available for off-highway machines

A multipurpose speed recorder designed to reduce lagging, overwinding, and overdriving on diesel-powered, off-the-road equipment is offered by The Service Recorder Co.

According to the manufacturer, it makes an accurate record of engine speed in revolutions per minute, and pinpoints operations on one-day or three-day charts. Models are also available for gasoline engines.

An accompanying unit is set to flash warning lights when engine rpm climbs too high or drops too low.

For further information write to The Service Recorder Co., Dept. C&E, 1013 Rockwell Ave., Cleveland 15, Ohio, or use the Request Card at page 18. Circle No. 68.



Used here in grinding down fins left by the joints of the forms, is a Milwaukee heavy-duty clutch-drive sander-grinder. The tool can be readily converted from sanding to grinding or wire brushing. It is sturdily constructed of lightweight cast-aluminum alloy, with ball and roller bearings throughout. For further information on sander-grinders, write to the Milwaukee Electric Tool Corp., Dept. C&E, 5316 W. State St., Milwaukee 8, Wis., or use the Request Card at page 18. Circle No. 92.

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For more facts, circle No. 402

CONTRACTORS AND ENGINEERS

Product LITERATURE

To obtain free copies of any of the literature described in the following section, circle the designated number on the Request Card at page 18.

A folder describing Richmond lifting inserts for pre-cast-concrete piles, beams, slabs, columns, tilt-up walls, prestressed girders and other precast and prestressed members. Helpful hints on lifting procedures. Several on-the-job photographs.

Write to the Richmond Screw An-
sler Co., Inc., Dept. C&E, 816-838
Brooklyn Ave., Brooklyn 8, N. Y., or
use the Request Card at page 18.
Circle No. 72.

Space heaters—a brochure listing the design and operating characteristics of three Aerol portable space heaters (125,000, 250,000, and 500,000 Btu). Stresses the benefits of the Model HE-S-125, which weighs only 85 pounds empty. Photographs and specifications.

Write to the Aerol Products Co., Inc., Dept. C&E, 75 Wesley St., S. Hackensack, N. J., or use the Request Card that is bound in at page 18 of this issue. Circle No. 107.

Ready-to-use mortar—a bulletin on Embeco premixed mortar for non-shrink water-resistant joints and masonry repairs. Contains illustrated instructions for use, plus comparative compressive-strength test results. Bulletin EPMM-2B.

Write to The Master Builders Co., Dept. C&E, 7016 Euclid Ave., Cleve-
land 3, Ohio, or use the Request Card at page 18. Circle No. 122.

Tail-gate spreader—literature describing the Hi-Way Model TG hydraulically operated tail-gate spreader. According to the literature, one of the main features of the TG is that any spreading width from 5 to 40 feet may be chosen merely by touching a fast-acting hydraulic control in the cab.

Write to the Highway Equipment Co., Dept. H20-4, Dept. C&E, 616 D Ave. N.W., Cedar Rapids, Iowa, or use the Request Card at page 18. Circle No. 61.

A catalog on Elgood reusable inflatable void forms. Illustrates the Voidcrete forming technique in pre-stressed hollow core slabs and hollow piles, and discusses general applications of Voidcrete forms. Catalog No. 601.

Write to Elgood Concrete Forms Corp., Dept. C&E, 378 Ten Eyck St., Brooklyn 6, N. Y., or use the Request Card at page 18. Circle No. 31.

Forms, form clamps—illustrated literature on Deslauriers form clamps and forms. Features the Econ-O-clamp, a column clamp that forms all square and rectangular columns 9 through 36 inches; automatically squares columns.

Write to the Deslauriers Column Mould Co., Inc., Dept. C&E, 5036 W. Lake St., Chicago 44, Ill., or use the Request Card at page 18. Circle No. 111.

Crawler-mounted loader—a bulletin describing the Koehring Model 205 Skooper, a full-revolving, crawler-mounted front-end loader. Illustrations and captions describe various mechanical features such as independent traction, hydraulic crowd and dump assembly, and standard cable hoist, and explain how the front-end loader's design cuts maintenance and operator fatigue. Bulletin K-636.

Write to the Koehring Co., Koehr-

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Spraybars for bituminous materials—literature describing Cartwright hot spraybars featuring non-clogging nozzles with a self-clearing draining slot back of each nozzle. Diagrams illustrate four styles. Write to the Berry Corp., Dept. 62, Stone Road, Lexington, Ky., or use the Request Card at page 18. Circle No. 75.

Cold-weather concreting—a pamphlet summarizing the American Concrete Institute's new standard recommendations for cold-weather concreting. Includes sections on accelerators, preparation before concreting, winter concreting objectives, and production required. Illustrates the effect of 2 per cent calcium chloride at temperatures of 73, 60, 40, and 25 F, on Type 1 and Type 2 cement.

Write to the Calcium Chloride Institute, Dept. C&E, 909 Ring Bldg., Washington 6, D. C., or use the Request Card at page 18. Circle No. 21.

Core drill—literature describing and illustrating portable Dymodrill equipment for concrete core drilling. The drills are offered in six heavy-duty models for drilling holes up to 6-inch diameter. Also includes information on bits, adapters, accessories.

Write to the Milwaukee Electric Tool Corp., Dept. C&E, 5316 W. State St., Milwaukee 8, Wis., or use the Request Card that is bound in at page 11. Circle No. 93.

Scaffolding and equipment—a catalog describing the complete Bil-Jax line of scaffolding and equipment. Contains a parts list and information on assembly methods. Well illustrated with photos and drawings. Write to Bil-Jax, Inc., Dept. C&E, P.O. Box 38, Archbold, Ohio, or use the Request Card at page 18. Circle No. 58.

Rotary portable compressors—a bulletin describing all-weather operation and other features of six models of Gardner-Denver rotary portable air compressors ranging from 85 to 300 cfm. Includes specifications and photographs showing typical heavy-duty applications. Bulletin RC-1.

Write to the Gardner-Denver Co., Dept. C&E, S. Front St., Quincy, Ill., or use the Request Card at page 18. Circle No. 38.

Psi calculator—the completely revised Forney calculator for instantly converting applied load into psi on a wide variety of cubes, cylinders, and masonry units. Make request on company letterhead.

Write to Forney's Inc., Tester Division, Dept. C&E, P. O. Box 310, New Castle, Pa., or use the Request Card at page 18. Circle No. 78.

Air hose—a brochure describing several types of Goodall air hose for a variety of applications. Illustrated with drawings and on-the-job photographs. Specifications.

Write to the Goodall Rubber Co., Dept. C&E, Whitehead Road, Trentham, N. J., or use the Request Card at page 18. Circle No. 45.

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Paints—a color reference guide listing over 300 of the latest colors used by construction-machinery manufacturers. Includes, along with the name of the vehicle and color, the stock number used by Limco, Dupont, Sherwin-Williams, and Ditzler for the color made by those firms.

Write to Limbacher Paint & Color Works, Inc., Dept. C&E, 515 Homestead Ave., Mt. Vernon, N. Y., or use the Request Card at page 18. Circle No. 26.

A fact sheet on the benefits of the Elgood synchronized hydraulic tensioning system combined with the firm's synchronized mechanical strut takeup system. Text illustrated with on-the-job photos. Fact Sheet PR-9.

Write to the Elgood Equipment Corp., Dept. C&E, 372-380 Ten Eyck St., Brooklyn 6, N. Y., or use the Request Card at page 18. Circle No. 74.

Motor drill and breaker—a folder showing many of the applications of the Atlas Copco Cobra motor drill and breaker. Technical features of the 53-pound gasoline-powered unit are illustrated by a cutaway drawing. On-the-job photos included. Leaflet E-1155.

Write to Atlas Copco Eastern, Dept. C&E, 610 Industrial Ave., Paramus, N. J., or use the Request Card at page 18. Circle No. 90.

Shovel replacement parts—a brochure on the Kensington line of shovel replacement parts. Contains illustrations showing the versatility and rugged construction of these parts for all makes and models of crawlers, shovels, cranes, and draglines.

Write to the Kensington Steel Division, Poor & Co., Dept. C&E, 505 E. Kensington Ave., Chicago 28, Ill., or use the Request Card at page 18. Circle No. 80.

Photocopier—a brochure on the new Photostat Positive Process for making photocopies in one direct step. Describes in detail the process, as well as types of paper and equipment to be used. In addition, lists more than 30 different uses.

Write to the Photostat Corp., Dept. C&E, 1001 Jefferson Road, Rochester 3, N. Y., or use the Request Card at page 18. Circle No. 28.

Steel-ply forms—a completely revised catalog containing detailed descriptions of all Symons steel-ply forms, as well as accessories such as fillers, corners, pilasters, and ties. Also contains a discussion on the basic

Symons system of forming. Photos illustrate text.

Write to the Symons Clamp & Mfg. Co., Dept. C&E, 4249 W. Diversey Ave., Chicago 39, Ill., or use the Request Card at page 18. Circle No. 52.

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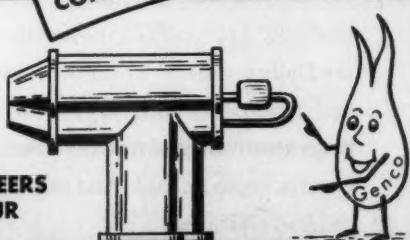


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Distributor Doings

Yale & Towne adds new firms to dealer list

Belmont Equipment Co., Inc., 315 E. Illinois St., Evansville, Ind., has been named a franchised sales and service representative for the Yale Materials Handling Division. The Yale & Towne Mfg. Co., Philadelphia. Yale industrial lift trucks and tractor shovels will be carried by the dealer in southwest Indiana, southeast Illinois, and western Kentucky.

Another new dealer named to handle the division's line is Dees Equipment Co., 1419 Westover Terrace,

Greensboro, N. C. Dees will cover the eastern, central, and northwestern part of the state. President of the firm is Rigdon O. Dees, Jr.; A. O. Gribble directs the service activities.

Pacific Mercury names

Lewis & Coulter, Inc., 1225 Washington Blvd., Pittsburgh, has been appointed a stocking distributor for flasher warning lights manufactured by Pacific Mercury, Van Nuys, Calif. The dealer will offer both neon and neon-transistorized PM flasher lights on a sales or rental basis.

RCA assigns five

Manufacturer's representatives for mobile communications equipment have been appointed by Radio Corp. of America, Camden, N. J. The dealers are: J. F. Ottmar Co., Spokane, Wash., operating in northeast Oregon, northern Idaho, and western Washington; Mobile Radio Service & Communications Corp., Shreveport, La., for the northwest part of the state; Miami Mobile, Inc., Miami, Fla., for the southern part of the state; Rocky Mountain Communication Co., Inc., Denver, covering Colorado, Utah, Wyoming, western Kansas, and western Nebraska; and Modern Electronics Laboratory Corp., Syracuse, N. Y., which will serve central New York State.

Cook Bros. to handle Koehring line of rigs

Cook Bros. Truck & Equipment Co., 7101 San Leandro St., Oakland, Calif., has been appointed a distributor for the complete construction-machinery line of Koehring Co., Milwaukee. The dealer, which will cover northern California and northwestern Nevada, now adds the Koehring, Buffalo-Springfield, Kwik-Mix, and KA-MO lines. It has sold and serviced products of the Parsons, C. S. Johnson, and Ko-Cal divisions for some time.

Curtiss-Wright division appoints distributor

Midwestern Engine & Equipment Co., Inc., 4645 Southwest Blvd., Tulsa, Okla., has been appointed a distributor for the complete line of construction machinery produced by the South Bend Division, Curtiss-Wright Corp., South Bend, Ind. The entire state will be served by the dealer, which also maintains a branch at 15 S. W. 23d St., Oklahoma City.

Parker-Hannifin names

Ridge Instrument Co., 162 Telmedia Road, Oak Ridge, Tenn., has been named a distributor by the Parker-Hannifin Corp., Cleveland. The dealer will carry industrial tube fittings and tube-working tools made by the corporation's Parker Fitting and Hose Division.

B-L-H division names

Boehck Construction Equipment Corp., 2404 W. Clybourn St., Milwaukee, has been named a distributor for Lima Austin-Western crushing, screening, and washing equipment produced by the Construction Equipment Division, Baldwin-Lima-Hamilton Corp., Lima, Ohio. The dealer will cover eight counties in the southeastern section of Wisconsin.

Shepherd names manager

Robert J. Loskill has been appointed general merchandising manager for Shepherd Machinery Co., East Los Angeles. During the past five years, he established operation of and managed Caterpillar Brazil S. A., Sao Paulo, Brazil.

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lift and lower snow plows automatically!

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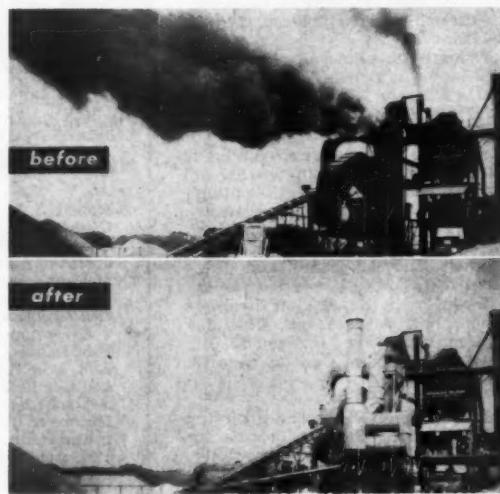
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Manufacturers Memos



New vice presidents of American Photocopy Equipment Co. are Leo J. Stuckens, left, and Edwin A. Matousek.

Three vice presidents have been named by the American Photocopy Equipment Co., Chicago. They are Leo J. Stuckens, director of photographic products for the office-equip-

ment company, with headquarters in Evanston, Ill.; Edwin A. Matousek, general manager of the Photo Paper Products Division, St. Louis; and Francis D. De Maio, general manager of APECO of Canada, Ltd., Toronto, Ontario.

John P. Horan has been promoted to market-research manager of the Yale Materials Handling Division, The Yale & Towne Mfg. Co., Philadelphia. He succeeds Frank P. Minnelli, who was recently named director of planning for the parent firm, on the staff of president Gilbert W. Chapman.



D. A. Bessmer,
president of The
Timken Roller
Bearing Co.

The new president of The Timken Roller Bearing Co., Canton, Ohio, is D. A. Bessmer. He succeeds William E. Umstattd, who retired as president but continues as a director and chairman of the executive committee. Bessmer, who had been serving as executive vice president, is succeeded by vice president H. E. Markley.

H. H. Timken, Jr., chairman of the board of directors, has relinquished the title of executive vice president.

W. R. Timken has dropped the title of vice president, but continues as chairman of the finance committee.

Several personnel changes have been made by Allis-Chalmers Mfg. Co., Milwaukee. E. D. Blank is the new construction-machinery sales manager at the company's Memphis, Tenn., branch. He succeeds L. D. Craggs, who is now the construction-machinery branch manager at Memphis.

The newly created post of director of public affairs is filled by Robert L. Koob, who will act as a consultant on government affairs to all the company's divisions. His activities will emphasize the role of citizenship in local, state, and national affairs.

A. E. Decker holds the post of manager of the Eastern area of the recently formed Defense Products Division. He will have headquarters in Washington, D. C., where he has been manager of the Washington office of the Tractor Group Government Sales Department. Decker continues to contact government agencies on the East Coast for the company.

George O. Pierce is manager of the Western area, with headquarters in Los Angeles. He joins the company with an extensive background in government engineering and procurement.

Sales supervisor for the Central area is Dale R. Shearburn. For the present, he has headquarters in Milwaukee.

Newly elected senior vice presidents of the company are Boyd S. Obetz and J. L. Singleton; both are former vice presidents. Two newly elected vice presidents are Roy M. Casper, general manager of the Atomic Energy Division, and L. W. Davis, general manager of the Farm Equipment Division.

The election of Kenneth E. Dougherty as assistant secretary is announced by James Talcott, Inc., New York City. He recently joined the commercial financing and factoring organization as senior credit executive in the Industrial Time Sales Division.

Robert G. Allen, president of Bucyrus-Erie Co., South Milwaukee, is now the firm's chief executive officer and A. S. Fueleicher is chairman of the board of directors. Both men succeed W. L. Little, who resigned after 32 years with the company.

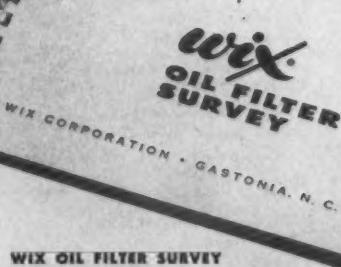
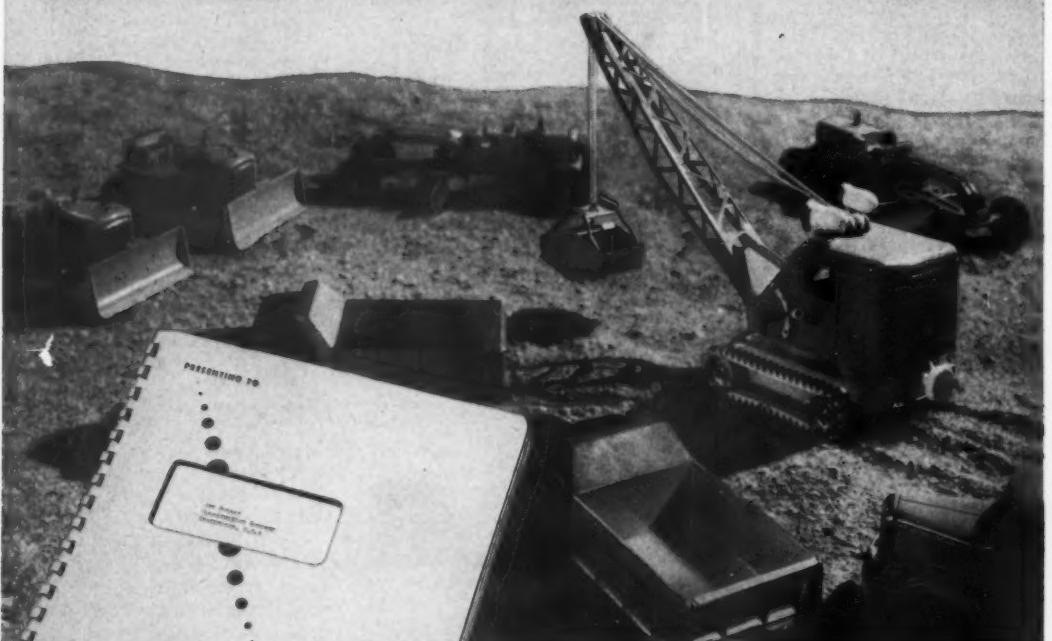
Newly appointed board members are Lawrence N. Murray and Victor C. Studley. Studley is a vice president of B-E.

Two top-level engineering appointments have been made by the Massey Ferguson Industrial Division, Wichita, Kans. Henry J. Thomas has been named chief engineer. He will supervise all engineering activities of the division and will maintain close liaison with the company's vice president of engineering and his staff at Detroit.

New consulting engineer is J. L. Michaels, who will assist Thomas in the supervision of engineering activities.

CONTRACTORS AND ENGINEERS

KNOW WHAT EACH VEHICLE NEEDS... WRONG GUESSES CAN COST YOU PLENTY IN DOWNTIME



WIX OIL FILTER SURVEY designates service needs of every filter on each vehicle...provides inventory control record...survey conducted by WIX factory trained specialist at no cost to you.

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KNOW your engines and KNOW their needs. WIX factory trained experts will help you at no cost. A WIX Filter Survey spots the filter requirements of every unit in your spread...Oil Filters...Air Filters...First and Second Stage Fuel Filters...Hydraulic Filters...and sets up a sound schedule for you. Here's better maintenance, fingertip inventory control and real economy...AND IT'S FREE!

Write and get the facts on a WIX FREE Filter Survey and how you can have full filter inventory protection! Write today!



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For more facts, use Request Card at page 18 and circle No. 418

and will specialize in technical aspects of design and the specification of materials and parts.

The new post of director of service for The Oliver Corp., Chicago, is filled by Richard K. Seidl, former branch manager at South Bend, Ind. In his



Richard K. Seidl,
director of service
for The Oliver
Corp.

new post, Seidl will assist in formulating service policies in all divisions of the company. He will have headquarters in the home office.

At the same time, M. T. Zoss succeeds Seidl at South Bend. R. G. Fults, former territory manager in the Indianapolis branch, becomes sales manager at Lansing, Mich. C. A. Patterson takes over the post of sales manager at the Utica, N. Y. branch, succeeding H. A. Parker, recently appointed eastern division regional sales manager.

H. L. Lawhead succeeds Patterson as sales manager at the Columbus, Ohio, branch; and L. E. Grote becomes credit manager at the same branch.



Karl S. Day, president of Standard Steel Works, Inc.

The new president of Standard Steel Works, Inc., North Kansas City, Mo., is Karl S. Day. He was previously manager of the Contract Manufacturing Division of Butler Mfg. Co.

Two new members have been elected to the board of directors of American Hoist & Derrick Co., St. Paul, Minn. They are Porter Thompson, a partner in the law firm of Howell, Brown, Perkins, Thompson & Hinckley of Portland, Maine, and Donald R. Berner, president of Sherrington & Berner, Indianapolis, subsidiary of American Hoist.

New senior sales engineer in the Middletown headquarters building sales department of Armetco Drainage & Metal Products, Inc., Middletown, Ohio, is Charles L. Johnson, formerly construction manager for the company's Dixie Division. He will be in charge of the revamped line of 3 buildings.

Caterpillar Tractor Co., Peoria, Ill., has promoted Dale W. Turnbull to the post of supervisor of wheel tractors and motor graders in the product section of the Product Division. Turnbull, former Oklahoma and Kansas district representative, will now be responsible for working with engineers in assessing production of new equipment and development direct to:

For more facts, circle No. 419→

Champion Mfg. Co., St. Louis, has appointed William V. Loncaric to the post of sales manager. He had formerly served as purchasing agent, district representative, and assistant sales manager. District representative Ted Flora succeeds Loncaric as assistant sales manager.

Electric Steel Foundry Co., Portland, Ore., has assigned Henry Swigert as district sales representative in Arizona and New Mexico. From headquarters in Phoenix, Swigert will handle sales of ESCO alloy and stainless-steel products for the construction, mining, and process

industries. He will also be responsible for sales of stainless-steel wrought and specialty items that the company distributes.

William L. Hearne has been appointed vice president of taxes for U. S. Steel Corp., Pittsburgh. He has served as a director of the tax division for the past 18 years.

At the same time, Leverne J. King was named vice president and assistant comptroller of the corporation. For the past two years, he has been a director of cost and statistics for general operating divisions and associated subsidiaries.

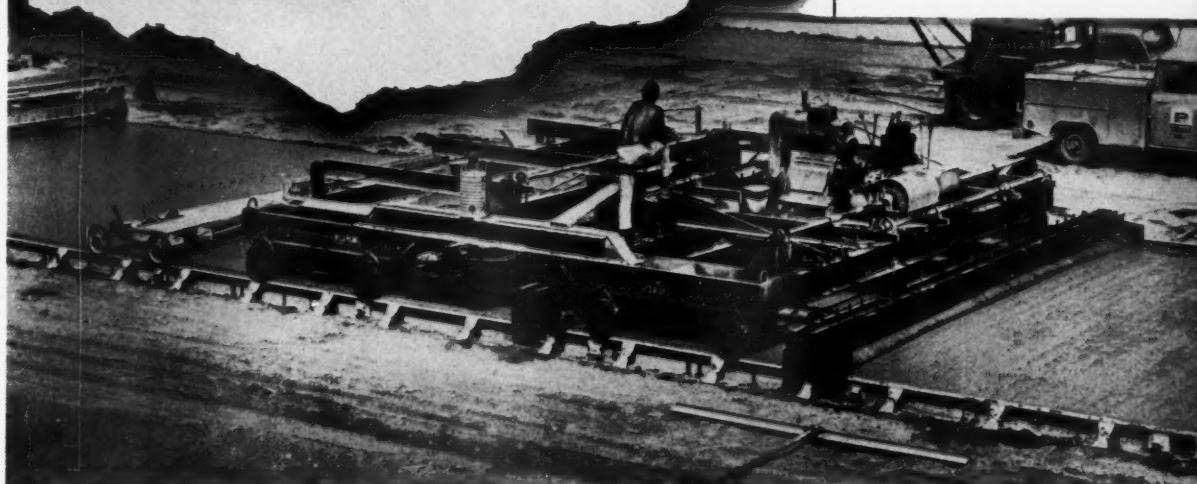
Thomas W. Thies, field engineer for the Construction Machinery Division, Clark Equipment Co.



Thomas W. Thies has been appointed field engineer for the Construction Machinery Division, Clark Equipment Co., Benton Harbor, Mich. He is assigned to field engineering duties throughout the United States. Before joining Clark, Thies was an engineer for Morrison-Knudsen Co.

5 PAVING RECORDS IN 14 MONTHS!

using Heltzel Flex-plane Combination
Finisher-float Machines



Michigan contractor finishes 6244 feet of 9" x 24' pavement in 12 hours...paves 5 miles in 5 consecutive working days!

The most recent of 5 paving records has been achieved by Pierson Contracting Company of Saginaw, Michigan. From Saturday, August 8th through Thursday, August 13th, they paved 26,526 feet of 9" x 24' pavement on U. S. 12 near Hartford, Michigan. Total hours worked—52.

On Tuesday, August 11th, 6244 feet were paved in 12 hours for the longest single day's run—and another new U. S. paving record.

Speed is not the final measure of a finishing machine's worth. But the ability to produce a finish that meets or exceeds State and Federal specifications, plus the capacity to do it faster and more economically, is important to every paving contractor. Several of these record-setting contractors have stated that their record runs would not have been possible without their "Combinations". Further proof that top-rated contractors depend on Flex-Plane top-rated finishing equipment.

If you haven't seen the record-breaking 1959 Flex-Plane Gas-Electric Combination Finisher-Float Machine, call your Flex-Plane Distributor today or write direct to:

* Paving records established using the Flex-Plane "Combination"

1 SARGENT CONSTRUCTION CO., Saginaw, Michigan, July '58. 5787' of 9" x 24' slab in 12½ hours.

2 DENTON CONSTRUCTION CO., Grosse Pointe Woods, Michigan, Aug. '58. 6029' of 9" x 24' slab in 12½ hours.

3 KOSS CONSTRUCTION CO., Des Moines, Iowa, June '59. 6067' of 9" x 24' slab in 12½ hours.

4 PIERSON CONTRACTING CO., Saginaw, Michigan, August '59. 6244' of 9" x 24' slab in 12 hours.

Canadian Record:

5 HURON CONSTRUCTION CO., Chatham, Ontario, July '59. 5290' of 9" x 12' slab in 12 hours.

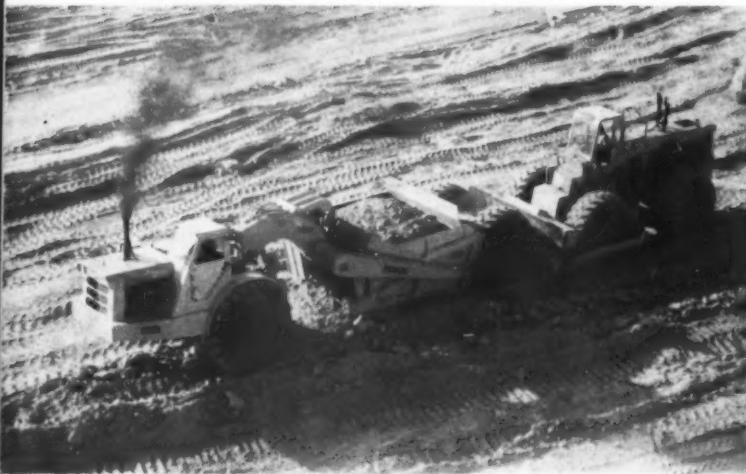
(above) Pierson's record-setting "Combination" at work on U. S. 12, Hartford, Michigan.

(below) Huron Construction's '59 Model Gas-Electric "Combination" setting new Canadian record.



THE FLEXIBLE ROAD JOINT MACHINE CO. Warren, Ohio

From coast to coast, owners report "more work done" with Michigan Scrapers



CALIFORNIA

U. S. Borax & Chemical Corp., digging out largest known deposit of sodium borate in world, gets BIG production from team of 29 yd Model 310 Michigan Scraper and 600 hp Model 480 Michigan Dozer. Payloads weigh out at 26 yds—3 yds more than biggest track-type pushers could load previously.



TEXAS

T. R. Vardeman & Son Construction Co., digging lake for City of San Augustine, posts good production average with their Model 210 Michigan Scraper. On 2,400 ft cycles, 19-yd rig moves 15 loads per hour.



KENTUCKY

Holloway & Sons Construction Co., building quarry-to-river dock access road, loads Model 110 Michigan Scrapers with small (85 hp) pusher, yet gets 8½ pay yds, scale-weighed, per trip. For added versatility, the 10½ yd pans interchange with 13 ton Rear Dumps. Scraper is also available in 4-wheel towed model.



FLORIDA

S. M. Wall Co., building a 10 mile, 120,000 yd cutoff around city of Archer, teamed two Model 210 Michigan Scrapers with a Model 280 Michigan Dozer: got 14 pay yd, 40 sec loading. Scrapers and pusher provided the efficiencies of identical power trains: matched speeds, easier maintenance, lower parts stocks.



NEW JERSEY

Sallcon Inc., forced by high labor costs to lay off men after each small job, then rehire for new contracts, solved critical operator training problem with Michigan Scrapers. Power-steered, power-shifted, torque converter Model 110's are "so easy to run," says owner, "new men become proficient after only a few cycles."



CONNECTICUT

Brancifort Bros., grading new shopping plaza, moved 1,400 yds per 9 hour day with their two Model 110's. Like all Michigans, units are fully hydraulic; only cable is short length, yoke to apron.



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